SERIAL NO. 3311

ONKYO SERVICE MANUAL

QUARTZ SYNTHESIZED TUNER AMPLIFIER MODELS TX-870/TX-870M

BHUD, BHUDN, MBHUDN	120V AC, 60Hz
MBHUWX	120/220V AC, 50/60Hz

SAFETY-RELATED COMPONENT WARNING!!
COMPONENTS IDENTIFIED BY MARK ⚠ ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

TABLE OF CONTENTS

ONKYO AUDIO COMPONENTS

SPECIFICATIONS

AMPLIFIER SECTION

Power Output:	105 watts per channel, min. RMS, at 8 ohms, both channels driven, from 20Hz to 20kHz, with no more than 0.025% total harmonic distortion	
Total Harmonic Distortion:		
IM Distortion:	0.025% at rated power	
Damping Factor:	80 at 8 ohms	
Frequency Response:	20-30,000Hz ± 1dB	
RIAA Deviation:	20-20,000Hz ± 0.5dB	
Sensitivity and Impedance:	Phono:	2.5mV/50kohms
	Phono (MC):	350μV/330 ohms
	CD/Tape Play:	150mV/50kohms
	Tape Rec:	150mV/3.5kohms
	Main In:	1V/47kohms
Phono Overload:	150mV RMS at 1kHz, 0.025% THD	
Signal-to-Noise Ratio:	Phono (MM):	93dB (at 10mV input, A weighted)
		75dB (IHF A-202)
	Phono (MC):	88dB (at 5mV input, A weighted)
		67dB (IHF A-202)
	CD/Tape:	98dB (A weighted)
		80dB (IHF A-202)
Tone Controls:	Bass:	± 10dB at 100Hz
	Treble:	± 10dB at 10kHz
Muting:	−20dB	

TUNER SECTION:

FM:

Tuning Range:	87.5-108.0MHz (50kHz steps or 25kHz steps)
Usable Sensitivity:	Mono: 10.8dBf, 1.9μV Stereo: 17.2dBf. 4.0μV
50dB Quieting Sensitivity:	Mono: 17.2dBf, 4.0μV Stereo: 37.2dBf. 40μV
Capture Ratio:	1.5dB
Image Rejection Ratio:	45dB
IF Rejection Ratio:	90dB
Signal-to-Noise Ratio:	Mono: 73dB Stereo: 67dB
Alternate Channel Attenuatior	65dB
AM Suppression Ratio:	50dB
Harmonic Distortion:	Mono: 0.1% Stereo: 0.2%
Frequency Response:	30-15,000Hz ± 1.5dB
Stereo Separation:	45dB at 1kHz/30dB at 100-10,000Hz
Tuning Level:	27/17dBf

AM:

Tuning Range:	530-1620kHz (10kHz steps) and/or 522-1611kHz (9kHz steps) (Worldwide model)
Usable Sensitivity:	30μV
Image Rejection Ratio:	40dB
IF Rejection Ratio:	40dB
Signal-to-Noise Ratio:	40dB
Harmonic Distortion:	0.7%

GENERAL

Power Supply:	
USA & Canadian models:	AC120V, 60Hz
Worldwide models:	120 and 220V switchable, 50/60Hz
Dimensions (W × H × D):	435(465) × 157(158) × 432(432)mm
	17-1/8″(18-5/16″) × 6-3/16″(6-3/16″) × 17″(17″)
Weight:	13.2(14.6)kg, 29.1(32.2)lbs

*( ) indicate worldwide models.

REMOTE CONTROL TRANSMITTER RC-118S

Transmitter:	Infrared
Signal range:	Approx. 5meters(16ft.4")
Power supply:	TWO "AA" batteries (1.5V×2)
Dimensions(W×H ×D):	64×18×176mm 2-1/2 " ×3/4 " × 7"
Weight:	140grams 5.0oz.(including batteries)

Specifications and features are subject to change without notice.

SERVICE PROCEDURES

1. Replacing the fuses

For continued protection against fire hazard, replace only with same type and same rating fuse.

D (120V) model

Circuit no.	Part no.	Description
F901	252052	7A (ST-6), Primary

W (Worldwide) model

Circuit no.	Part no.	Description
F901	252052	7A (ST-6), Primary
F902	252077	4A-SE-EAK, Primary

2. Change of AM band step.

With the exception of the models below, a BAND STEP selector switch is not provided.

BAND STEP	D763, JL009
10kHz→ 9kHz	Additional
9kHz→10kHz	Eliminated

In D763 1SS133 (Part No. 223163) is used. Between #1 and #2 of JL009 a jumper lead must be inserted.
(Refer to page 23)

– Worldwide model –

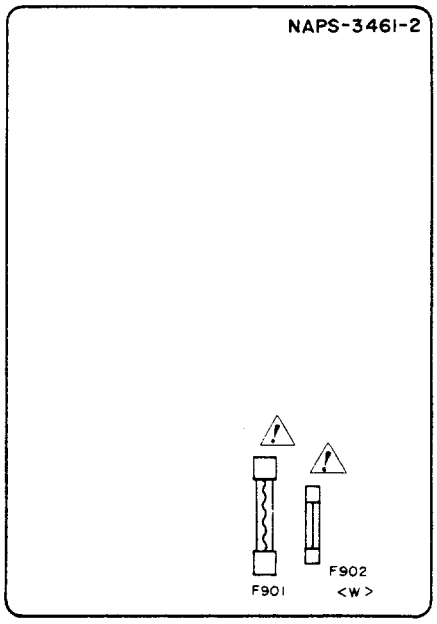
Worldwide models are equipped with a step band selector switch. This switch is located on the back panel. This switch is set to 10kHz and 9kHz at the factory, but may have to be reset to 9kHz or 10kHz depending on the area where the unit is used.

	De-emphasis	AM step
Europe:	50μsec	9kHz
U.S.A.:	75μsec	10kHz

3. Change of voltage

Worldwide models are equipped with a voltage selector to conform with local power supplies. This switch is located on the back panel. Be sure to set this switch to match the voltage of the power supply in your area before turning the power switch on.

This switch is set to 220V at the factory. Voltage is changed by sliding the groove in the switch with the screw-driver to the right or left. Confirm that the switch has been moved all the way to the right or left before turning the power switch on.



POWER SUPPLY CIRCUIT PC BOARD

4. Safety-check out

(Only U.S.A. model)

After correcting the original service problem perform the following safety check before releasing the set to the customer.

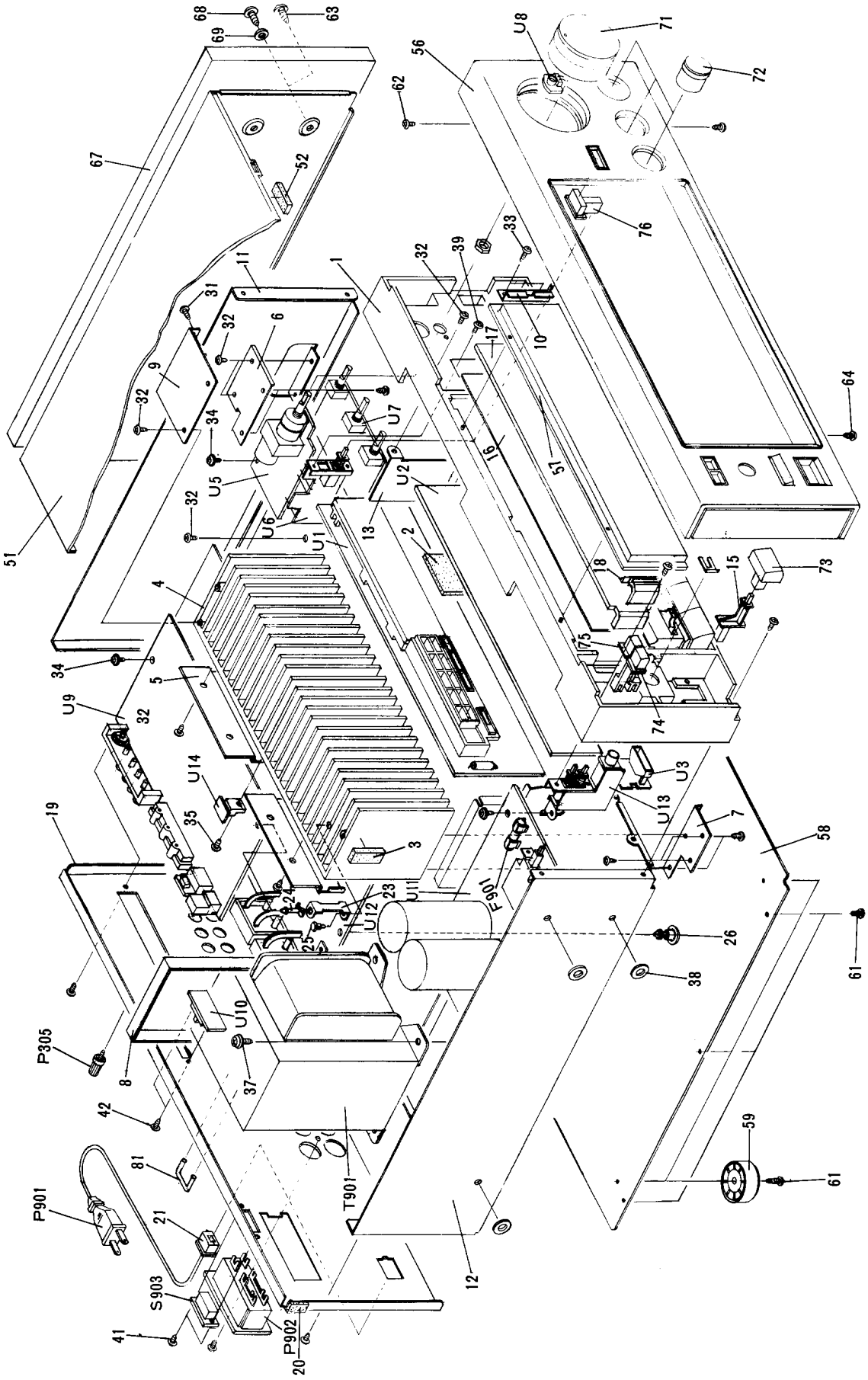
Connect the insulating-resistance tester between the plug of power supply cord and terminal GND on the back panel.

Specifications: 3.3 Mohm ±10% at 500V.

5. Memory preservation

This unit does not require memory preservation batteries. A built-in memory power back-up system preserves contents of the memory during power failures and even when the unit is unplugged. The unit must be plugged in and the power switch turned on and off once in order to charge the back-up system. Note that since this is not a permanent memory the power switch must be turned on and off a few times each month to keep the back-up system operative. The period of time during which memory contents are preserved after power has last been turned off varies depending on climate and placement of the unit. On the average, memory contents are protected over a period of 3 to 4 weeks (a minimum of 2 weeks) after the last time power has been turned off. This period is shorter when the unit is exposed to very high humidity or used in an area with an extremely humid climate.

EXPLODED VIEW



PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
1	27110457B	Front bracket ass'y
2	28140923	t3×60×45, Cushion
3	28140927	t2×30×10, Cushion
4	27160236A	Radiator
5	27130435	Bracket, transistor
6	27141301	Bracket HR
7	27141302	Bracket HL
8	27141321	Bracket, power transformer
9	27141322-1	Bracket R
10	27141300	Bracket S
11	27115240A	Side bracket R
12	27130564A	Bracket, power transformer
13	27130565A	Bracket F
15	27273111	Joint, power
16	28133212	Back plate
17	28130252	Dial plate
18	27190686	Holder, dial plate
19	27121195	Back panel 〈D〉
	27121196	Back panel 〈W〉
20	28140020	t2×10×40, Cushion
21	27300750	⚠ Strainrelief
23	27141200A	Bracket, pc board
24	27190062	KGLS-12S, Holder
25	880009	Rivert
26	27190693	KGLS-6R, Holder
31	838430068	3TTB+6B(BC), Tapping screw
32	834430088	3TTS+8B(BC), Tapping screw
33	833430080	3TTP+8P(BC), Tapping screw
34	831130088	3TTW+8B, Tapping screw
35	834430108	3TTS+10B(BC), Tapping screw
36	834230108	3TTS+10B(Ni), Tapping screw
37	830440089	4TTC+8C(BC), Tapping screw
38	27270212	Spacer
39	82143006	3P+6FN(BC), Pan head screw
40	833426060	2.6TTP+6P(BC), Tapping screw for U2
41	82143006	3P+6FN(BC), Pan head screw(Voltage selsctor switch)〈W〉
42	82142604	2.6P+4F(BC), Pan head screw(Band/De-emphasis switch)〈W〉

REF. NO.	PART NO.	DESCRIPTION
51	28184419A	Top cover
52	28140020	t4×10×40, Cushion
56	1A121121	Front panel ass'y
57	28191491A	Clear plate —
58	27170254B	Bottom board
59	27175153	Leg
61	834430088	3TTS+8B(BC), Tapping screw
62	833430080	3TTP+8P(BC), Tapping screw
63	838440089	4TTB+8C(BC), Tapping screw
64	834430108	3TTF+10B(BC), Tapping screw
66	28185340A	Side panel L〈W〉
67	28185342A	Side panel R〈W〉
68	836440303	4STV+30CQ(BC), Tapping screw〈W〉
69	870086	W4×12(BC), Special Washer〈W〉
71	28323558	Knob VOLUME
72	28323559	Knob TONE
73	28323241A	Knob POWER
74	28323314	Knob SPEAKER A
75	28323316	Knob SPEAKER B
76	28323560	Knob PUSH
81	27141033	Connection plug(pre out-main in)
F901	252052	⚠ 7A(ST-6), Primary fuse
F902	252077	⚠ 4A-SE-EAK, Primary fuse〈W〉
P305	25060044	Terminal GND
P901	253123, 253136, 253140 or 253146	⚠ AS-UC-6 #18, Power supply cord
P902	25050293	⚠ NSCT-6P120, AC outlet
Q525,Q526	2201703,	2SC3855-O,
Q529,Q530	2201704 or 2201706	2SC3855-Y or 2SC3855-P, Power transistor
Q527,Q528	2201693,	2SA1491-O
Q531,Q532	2201694 or 2201696	2SA1491-Y or 2SA1491-P, Power transistor
S903	26065123	⚠ NSS-1258P, Voltage selector switch〈W〉
T901	2300381	⚠ NPT-1017D, Power transformer〈D〉
	2300382	⚠ NPT-1017DG, Power transformer〈W〉

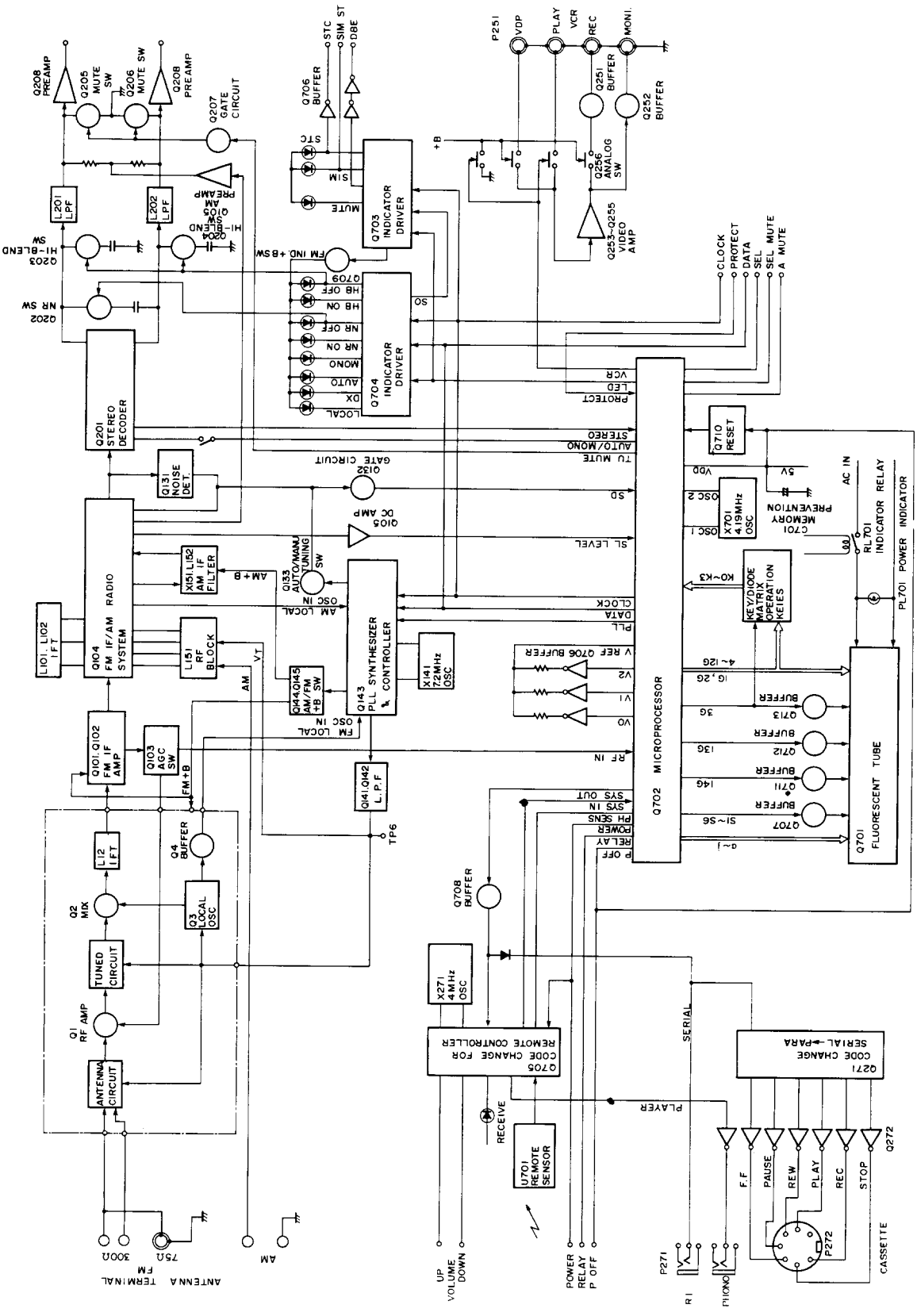
REF. NO.	PART NO.	DESCRIPTION
U1	1A121552-2	NADIS-3452-2, Display circuit pc board ass'y
U2	1A121553-2	NASW-3453-2, Operation switch pc board ass'y〈D〉
	1A122553-2A	NASW-3453-2A, Operation switch pc board ass'y〈W〉
U3	1A121554-2	NASW-3454-2, Stand-by switch pc board ass'y
U4	1A122555-2	NASW-3455-2, AM band step selector pc board ass'y〈W〉
U5	1A121556-2	NAAF-3456-2, Volume pc board ass'y
U6	1A121557-2	NASW-3457-2, Mode switch pc board ass'y
U7	1A121558-2	NAAF-3458-2, Tone control circuit pc board ass'y
U8	1A121559-2	NADIS-3459-2, Volume indicator pc board ass'y
U9	1A121560-2	NARF-3460-2, FM/AM tuner pc board ass'y〈D〉
	1A122560-2A	NARF-3460-2A, FM/AM tuner pc board ass'y〈W〉
U10	1A122567-2	NASW-3467-2, De-emphasis switch pc board ass'y〈W〉
U11	1A121561-2	NAPS-3461-2, Power supply circuit pc board ass'y〈D〉
	1A122561-2A	NAPS-3461-2A, Power supply circuit pc board ass'y〈W〉
U12	1A121562-2	NAAF-3462-2, Pre. and power amplifier pc board ass'y
U13	1A121563-2	NASW-3463-2, Speaker switch pc board ass'y
U14	1A121564-2	NAETC-3464-2, Power supply transistor pc board ass'y
U15	1A121565-2	NAETC-3465-2, Power supply transistor pc board ass'y

NOTE: 〈D〉: Only 120V model
〈W〉: Only Worldwide model

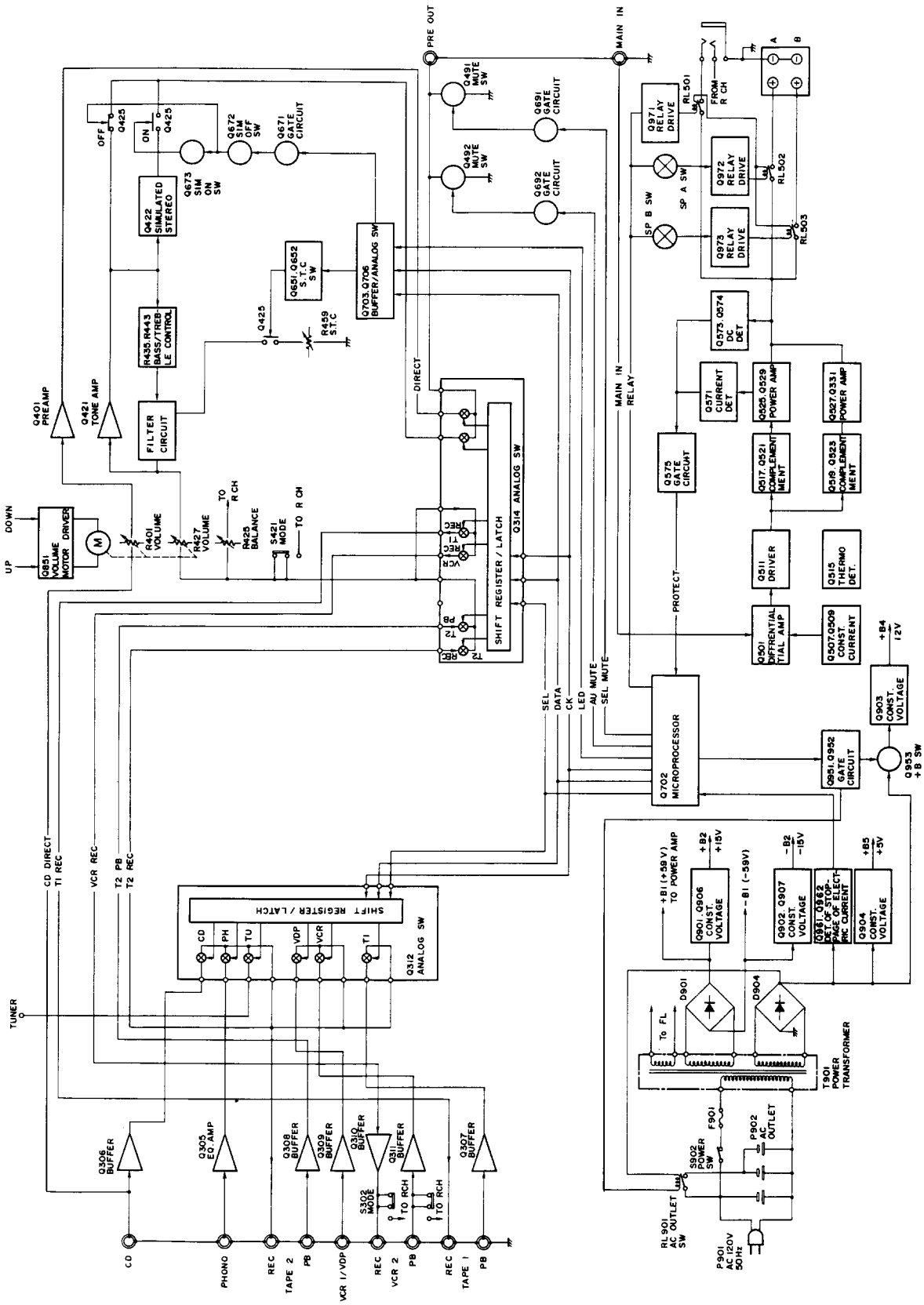
NOTE: THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBERS SPECIFIED.

BLOCK DIAGRAM

— TUNER SECTION —

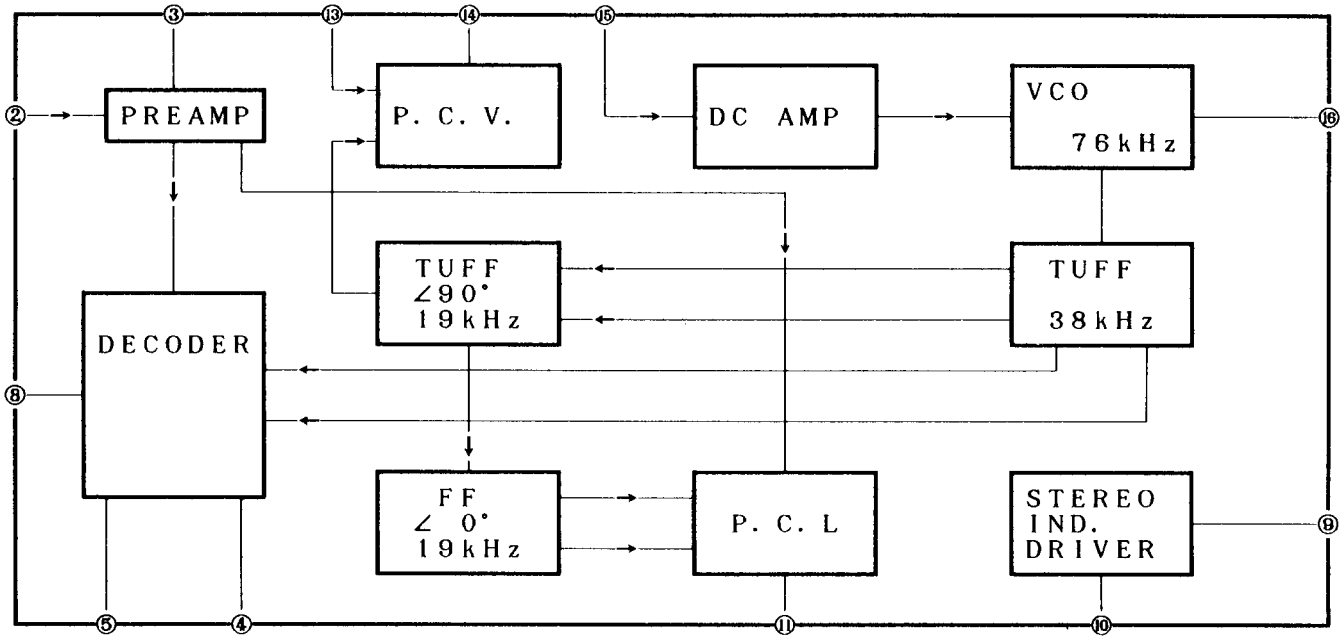


— AMPLIFIER SECTION —

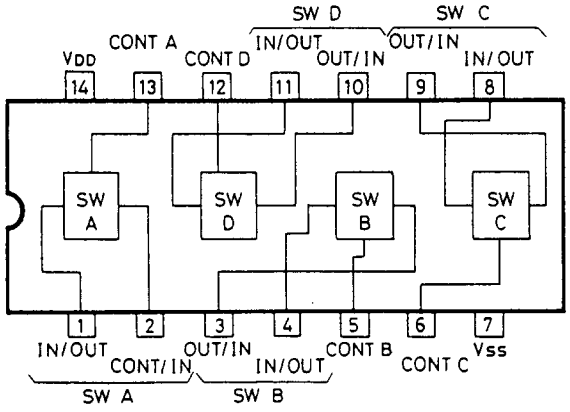


IC BLOCK DIAGRAM AND DESCRIPTIONS

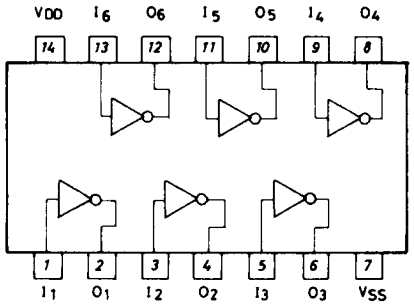
HA12016 (FM STEREO DECODER)



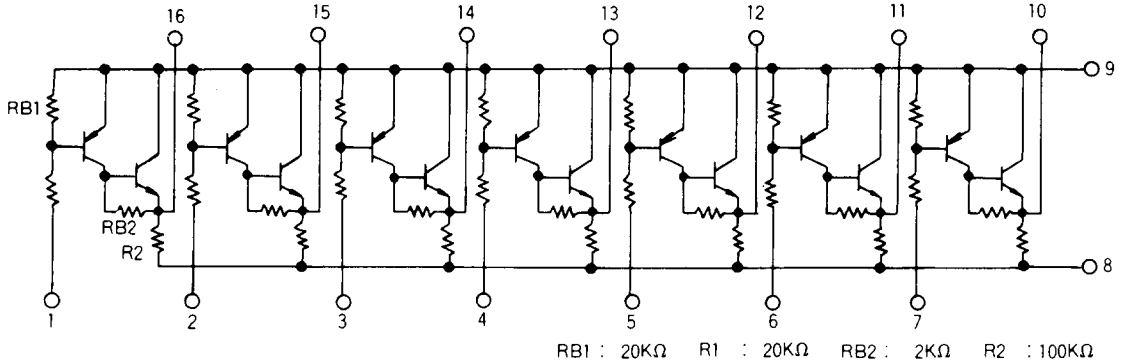
LC4966 (ANALOG SWITCH)



4069UB (HEX INVERTER)

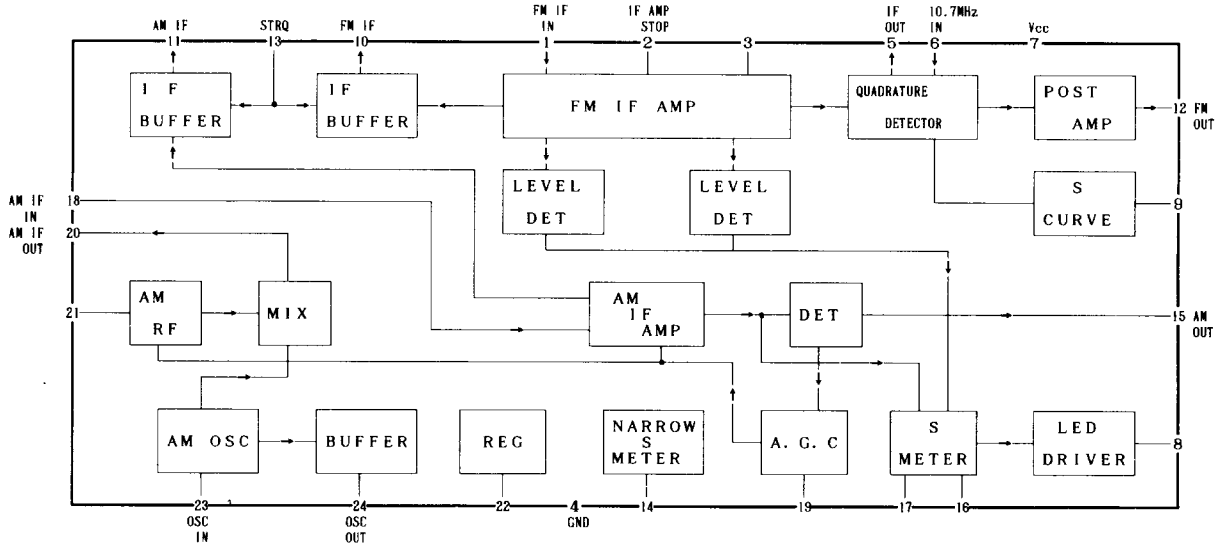


μPA81C (INVERTER/BUFFER)

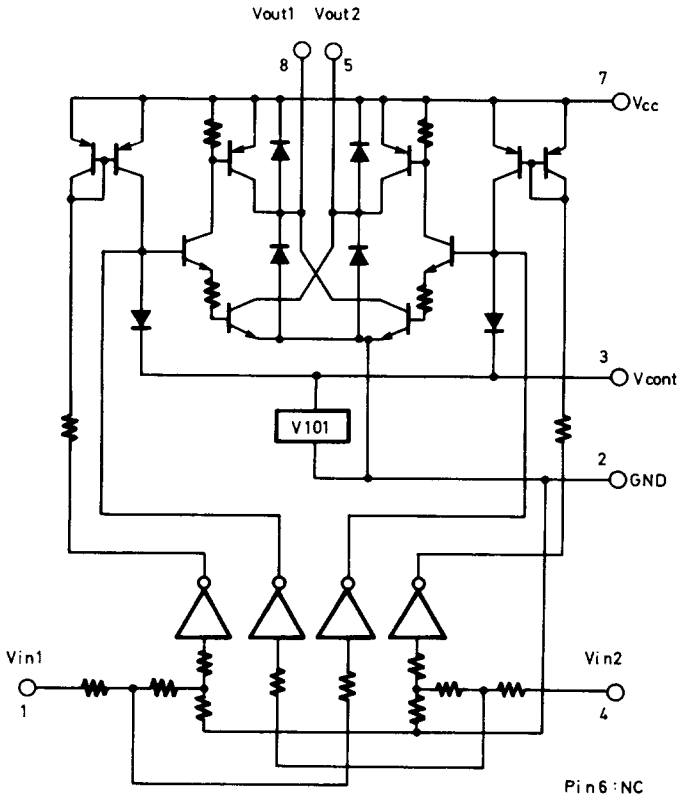


RB1 : 20KΩ R1 : 20KΩ RB2 : 2KΩ R2 : 100KΩ

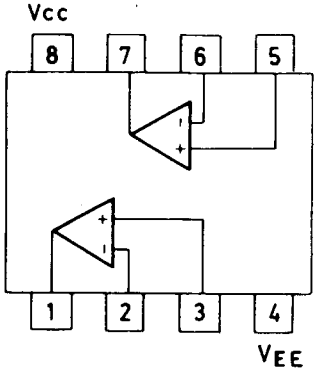
LA1266A (FM IF AND AM RADIO SYSTEM)



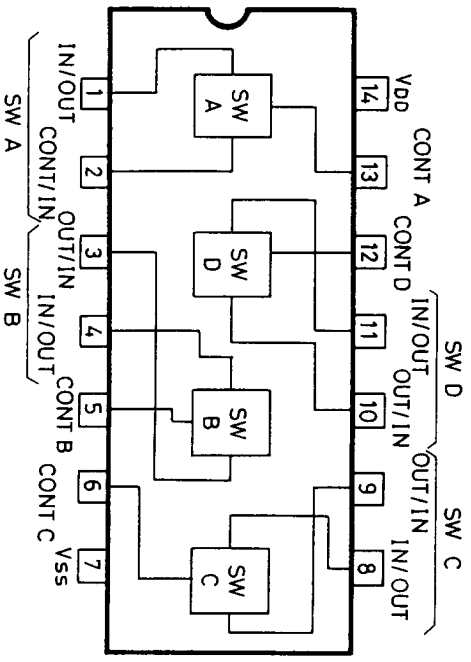
LB1630 (MOTOR DRIVER)



NJM4565DD/NJM4558DX/ μPC4570C (OP. AMP)



4066B (ANALOG SWITCH)



TRUTH TABLE

IN 1	IN 2	OUT 1	OUT 2	MOTOR
H	L	H	L	Normal
L	H	L	H	Reverse
H	H	OFF	OFF	Wait
L	L	OFF	OFF	Wait

LC6538D-3838 (MICROPROCESSOR)

Pin No.	Symbol	Description
1 2 3 4 5 6 7 8 9 10 11 12 13 14	D14 D13 D12 D11 D10 D9 D8 D7 D6 D5 D4 D3 D2 D1	These are the digit and key scan signal output terminals. "H" when active. Refer to the key and diode matrix.
15	VDD	Power supply terminal. (+5V)
16 17	OSC1 OSC2	Connect to the 4.19MHz ceramic oscillator.
18	VSS	Ground terminal.
19	TEST	Test terminal. Connect to the ground.
20	$\overline{\text{RES}}$	This is the input terminal for reset when the power switch turns on. "L" when active.
21 22	X1 X2	Sub clock terminal. Not used. Terminal X1 Connects to the ground.
23	POWER	This is the output terminal for power source. It is "H" for power on. This signal controls to the power supply circuit and the relay for AC outlet.
24	RELAY	This is the output terminal for control of the speaker and headphone relaies. "H" when active.
25 26	VDP VCR	These are the output terminals for control of video signal.
27	$\overline{\text{PHONO}}$	This is the output terminal for control of record player. "L" when the source selector is PHONO
28	MUTING	This is the output terminal for muting control. "H" when active.
29	SEL MUTE	This is the muting output terminal when the selector key is operated. "H" when active.
30	TUNER MUTE	This is the output terminal for muting control of tuner section. "H" when active.
31 32 33 34	K0 K1 K2 K3	These are the input terminals for key return signal source and diode matrix. "H" when active.
35	S IN	This is the signal strength input terminal.
36	SD	Auto stop signal input terminal. Auto tuning stops when this terminal becomes to the high level
37	$\overline{\text{STEREO}}$	This is the input terminal for detection of the stereo broadcast. "L" when active.
38	RF IN	This is the input terminal for RF level.
39	LED	This is the output terminal for indicator LED driver. Connect to terminal LAT of μPD6345C.
40	VREF	This is the input terminal for comparator reference voltage.
41	$\overline{\text{AUTO}}$/MONO	This is the AUTO/MONO switching output terminal. "L" when AUTO.
42	PLL	Connect to the terminal CE of PLL IC (LM7001).
43	DATA	This is the serial data output terminal. Connect to the terminal DATA of PLL IC, and terminal DI of LED driver (μPD6345C), and terminal DI of analog switches (LC7821/LC7822).
44	CL	This is the serial clock output terminal. Connect to the terminal CI of PLL IC, and terminal SCK of LED driver, and terminal CL of analog switches.
45	SEL	Connect to the terminal SEL of analog switches.
46 47 48	$\overline{\text{VO}}$ $\overline{\text{V1}}$ $\overline{\text{V2}}$	These are the output terminals for comparator reference voltage. Refer to the signal level indicator circuit.
49	$\overline{\text{P OFF}}$	This is the input terminal for detection of the stoppage of electric current. "L" when the stoppage of electric cerrent.
50	PROTECT	This is the detection terminal for protection circuit. The speaker and headphone relaies turn off when this terminal become to the high level.
51	$\overline{\text{SYSTEM OUT}}$	This is the output terminal for system code. "L" when active.
52	SYSTEM IN	This is the input terminal for system code. "H" when active.

Pin No.	Symbol	Description
53	$\overline{\text{DISPLAY}}$	This is the display output terminal. This signal controls to the static indication section of fluorescent tube. "L" when active.
54 55 56 57 58 59 60 61	Sa Sb Sc Sd Se Sf Sg Sh	These are the segment signal output terminals. "H" when active.
62	VP	Pull-down resistor connection terminal of FIP controller/driver.
63 64	Si Sj	These are the segment signal output terminals. "H" when active.

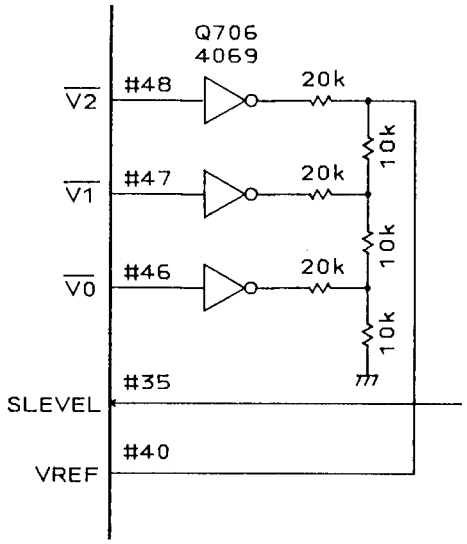
KEY AND DIODE MATRIX

	K3 (#34)	K2 (#33)	K1 (#32)	K0 (#31)	
D1 (#14)	M4	M3	M2	M1	
D2 (#13)	M8	M7	M6	M5	
D3 (#12)	MEMORY	SHIFT	M10	M9	
D4 (#11)	TU LEVEL	FM MUTE	UP	DOWN	
D5 (#10)	CD DIRECT	POWER	APR	ANT	
D6 (#9)	AM	FM	PHONO	CD	
D7 (#8)	TAPE 2	TAPE 1	VCR	VDP	
D8 (#7)	SIM STEREO	STC	DBE	REC SEL	
D9 (#6)				AUTO/MONO	ALTERNATE KEY
D10 (#5)	SYS DIS(1)	TI DIS(0)	AM9K ($^{0}/_{1}$)	MODE	DIODE MATRIX

AM9K (AM band step setting diode matrix)

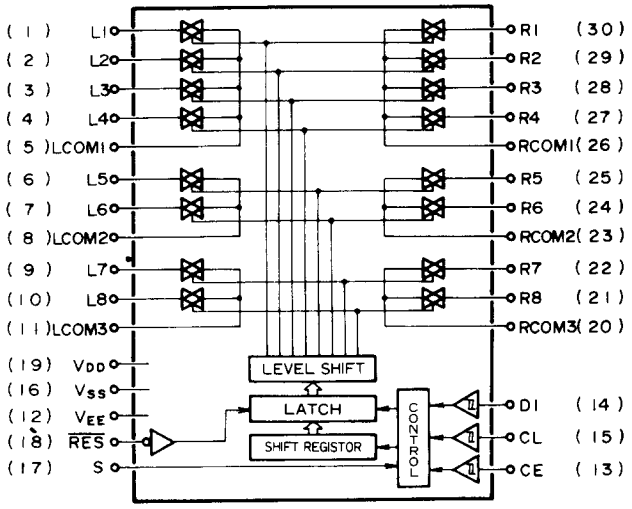
D763	Frequency range	Channel space	Refernce frequency	IF frequency
0	530~1620kHz	10kHz	10kHz	450kHz
1	522~1611kHz	9kHz	9kHz	450kHz

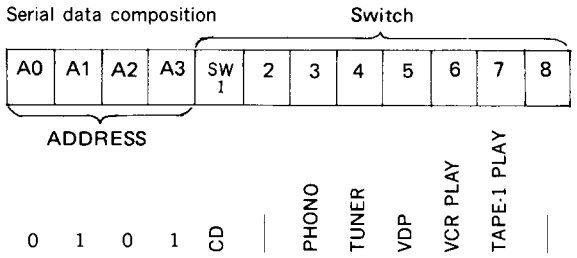
SIGNAL LEVEL INDICATOR CIRCUIT



Output terminals			Signal strength indicator
$\overline{V2}$	$\overline{V1}$	$\overline{V0}$	
H	H	H	Light off
H	H	L	Light off
H	L	H	1st on
H	L	L	2nd on
L	H	H	3th on
L	H	L	4th on
L	L	H	5th on
L	L	L	5th on

LC7821 (Analog switch)



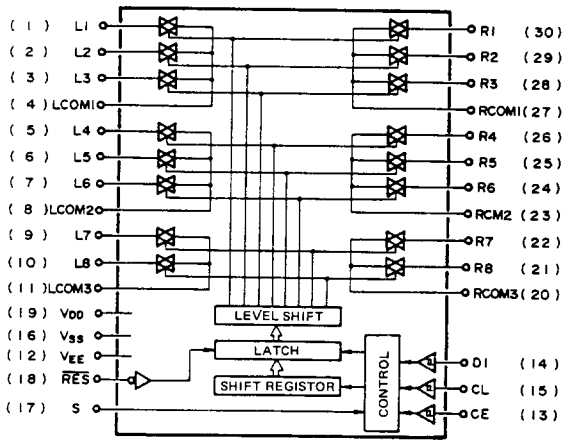


(Q312)

Pin No.	Terminal	Description
1	CD	Input/output terminals of audio signal of right channel. Control to the inside analog switch at the serial data.
2	—	
3	PHONO	
4	TUNER	
5	L COM 1	
6	VDP	
7	VCR PLAY	
8	L COM 2	
9	TAPE 1 PLAY	
10	—	
11	L COM 3	
12	V_{EE}	Negative power supply terminal. (−15V)
13	CE	Chip enable terminal. Connect to SEL terminal of LC6538D-3838.
14	DI	Serial data input terminal. Connect to DATA terminal of LC6538D-3838.
15	CL	Serial clock input terminal. Connect to CLOCK terminal of LC6538D-3838.

Pin No.	Terminal	Description
16	Vss	Ground terminal.
17	S	Selector terminal.
18	RES	Reset terminal. When power is turned ON, the condition of the analog switch is not determined, but when this terminal is "L", all analog switches are OFF.
19	VDD	Power supply terminal. (+15V)
20	R COM 3	Input/output terminals of audio signal of left channel. Control to the inside analog switch at the serial data.
21	—	
22	TAPE 1 PLAY	
23	R COM 2	
24	VCR PLAY	
25	VDP	
26	R COM 1	
27	TUNER	
28	PHONO	
29	—	
30	CD	

LC7822 (ANALOG SWITCH)



Serial data composition

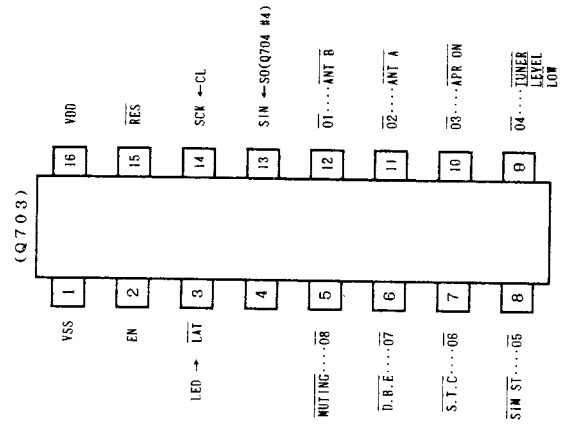
A0 L	A1 H	A2 L	A3 H	SW 1	2	3	4	5	6	7	8
ADDRESS				Switch							
0	0	1	1	TAPE-2 REC	TAPE-2 PLAY	SOURCE		VCR REC	TAPE-1 REC	CD DIRECT	CD DIRECT

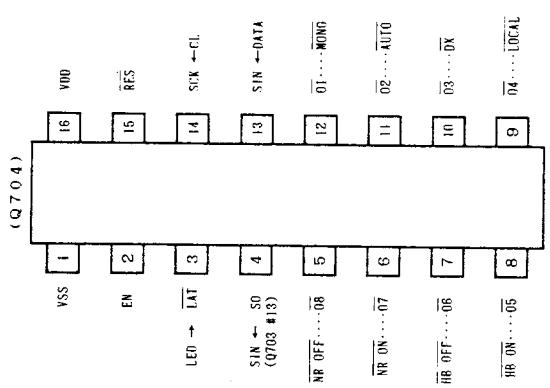
(Q314)

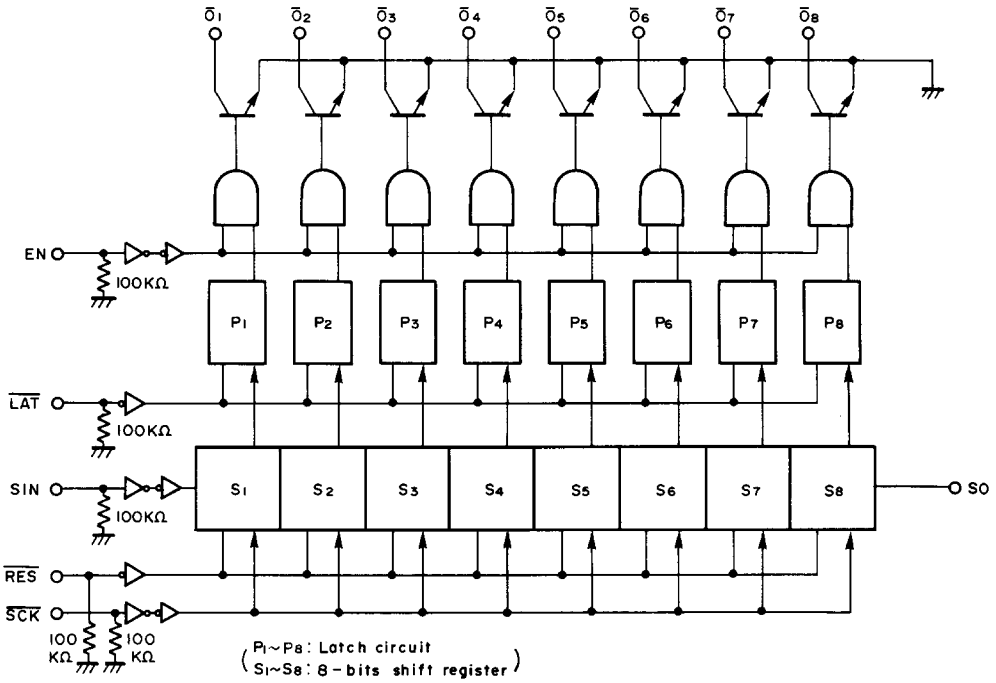
Pin No.	Terminal	Description
1	TAPE 2 REC	Input/output terminals of audio signal of right channel. Control to the inside analog switch at the serial data.
2	TAPE 2 PB	
3	SOURCE	
4	L COM 1	
5	—	
6	VCR REC	
7	TAPE 1 REC	
8	L COM 2	
9	CD DIRECT	
10	$\overline{\text{CD DIRECT}}$	
11	L COM 3	
12	V_{EE}	Negative power supply terminal. (−15V)
13	CE	Chip enable terminal. Connect to SEL terminal of LC6538D-3838.
14	DI	Serial data input terminal. Connect to DATA terminal of LC6538D-3838.
15	CL	Serial clock input terminal. Connect to CLOCK terminal of LC6538D-3838.

Pin No.	Terminal	Description
16	Vss	Ground terminal.
17	S	Selector terminal.
18	RES	Reset terminal. When power is turned ON, the condition of the analog switch is not determined, but when this terminal is "L", all analog switches are OFF.
19	V_{DD}	Power supply terminal. (+5V)
20	R COM 3	Input/output terminals of audio signal of left channel. Control to the inside analog switch at the serial data.
21	$\overline{\text{CD DIRECT}}$	
22	CD DIRECT	
23	R COM 2	
24	TAPE 1 REC	
25	VCR REC	
26	—	
27	R COM 1	
28	SOURCE	
29	TAPE 2 PB	
30	TAPE 2 REC	

μPD6345C (INDICATOR LED DRIVER)







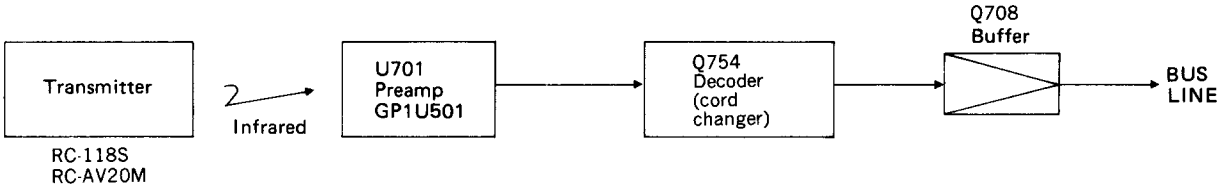
(Q704)

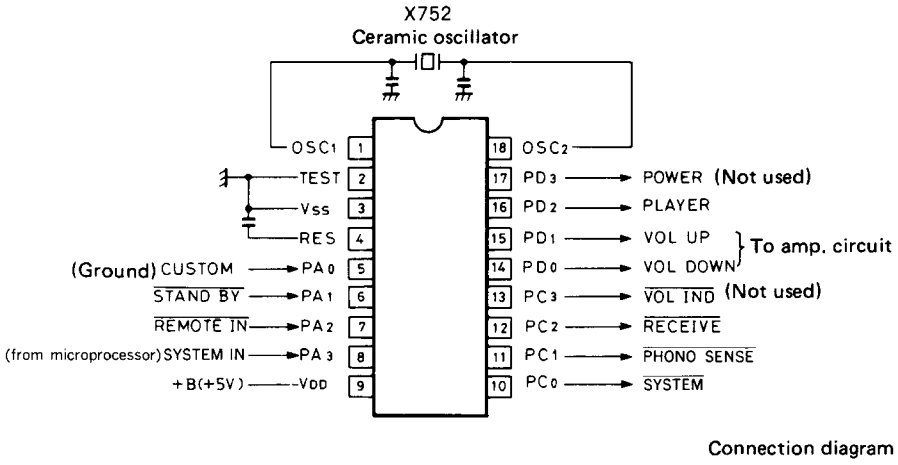
Pin No.	Symbol	Descriptions
1	VSS	Ground terminal.
2	EN	Enable terminal. Connect to 5V.
3	$\overline{LAT}$	Latch terminal. Connect to the terminal LED of LC6538D-3838.
4	S0	Serial data output terminal. Connect to terminal SIN of μPD6345C(Q703)
5~12	$\overline{08}$~$\overline{01}$	Data output terminals. Connect to the indicator L. E. Ds.
13	SIN	Serial data input terminal. Connect to the terminal DATA of LC6538D-3838.
14	SCK	Serial clock input terminal. Connect to the terminal CL of LC6538D-3838.
15	$\overline{RES}$	Reset input terminal. "L" when active.
16	VDD	Power supply terminal. (+5V)

(Q703)

Pin No.	Symbol	Descriptions
1	VSS	Ground terminal.
2	EN	Enable terminal. Connect to 5V.
3	$\overline{LAT}$	Latch terminal. Connect to the terminal LED of LC6538D-3838.
4	S0	Serial data output terminal.
5~12	$\overline{08}$~$\overline{01}$	Data output terminals. Connect to the indicator L. E. Ds.
13	SIN	Serial data input terminal. Connect to the terminal S0 of μPD6345C(Q704).
14	SCK	Serial clock input terminal. Connect to the terminal CL of LC6538D-3838.
15	$\overline{RES}$	Reset input terminal. "L" when active.
16	VDD	Power supply terminal. (+5V)

LC6527C-3802 (CODE CHANGER)

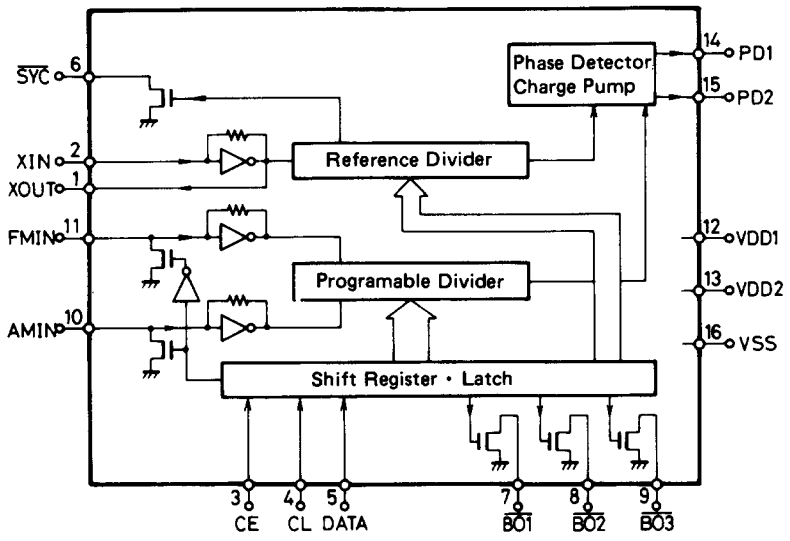




Connection diagram

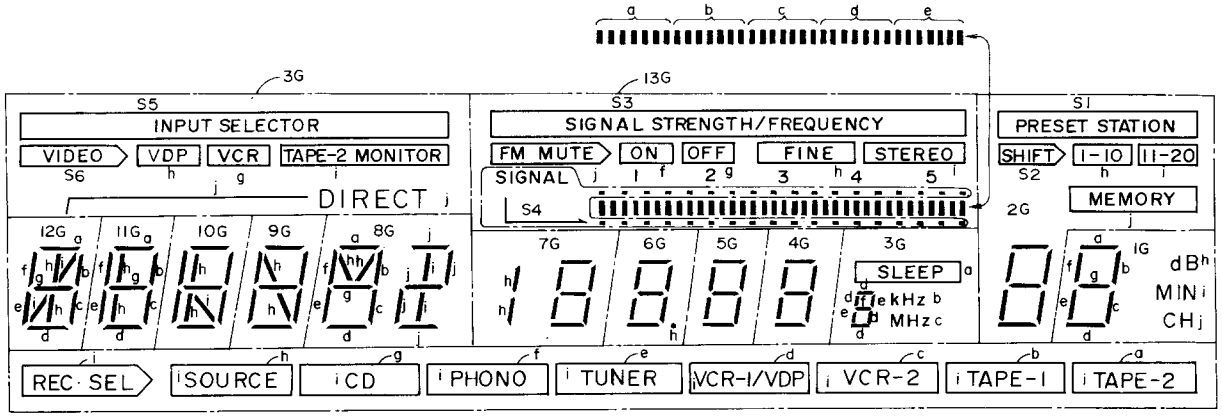
Terminal No.	Symbol	Terminal	Description
1 18	OSC1 OSC2	OSC	Connect to the 4MHz ceramic oscillator.
2	TEST	TEST	Test terminal. Connect to the ground.
3	Vss	GND	Ground terminal.
4	$\overline{RES}$	$\overline{RES}$	Reset terminal.
5	PA0	CUSTOM	The custom code for decode is selected at this terminal. For this model, the level is low.
6	PA1	$\overline{STANDBY}$	Terminal for STANDBY detection. During low input, only the POWER code is decoded.
7	PA2	$\overline{REMOTE\ IN}$	Signal input terminal from remote control preamp. Active low.
8	PA3	SYSTEM IN	System code input terminal. Active high.
9	V_{DD}	+B(5V)	Power supply terminal.
10	PC0	$\overline{SYSTEM\ OUT}$	Output at this terminal are the custom code remote control code input to REMOTE IN, the system code that has been converted corresponding to the decoded data code.
11	PC1	$\overline{PH\ SENS}$	Phono detection input terminal. Active low.
12	PC2	$\overline{RECEIVE}$	This is the display output for remote control reception. Output is low when decoded code is being received.
13	PC3	$\overline{VOLIND}$	During output of VOLUME UP/DOWN, a pulse (⌈T⌊T⌈T⌊; T=250ms) is output.
14	PD0	VOL DOWN	When the volume DOWN code is input, a high pulse of 120ms is output.
15	PD1	VOL UP	When the volume UP code is input, a high pulse of 120ms is output.
16	PD2	PLAYER	Player control output terminal.
17	PD3	POWER	The power code input inverts the L/H. Level is high for power being tumed ON.

LM7001 (PLL SYNTHESIZER AND CONTROLLER)



Pin No.	Terminal	Description
1	XOUT	Connect to the 7.2 MHz crystal oscillator.
2	XIN	
3	CE	Chip enable terminal. Connect to the PLL terminal of LC6538D-3838.
4	CL	Serial clock input terminal. Connect to the CL terminal of LC6538D-3838.
5	DATA	Serial data input terminal. Connect to the DATA terminal of LC6538D-3838.
6	$\overline{SYN}$	Not used.
7	$\overline{BO1}$	Antenna selector output terminal. Antenna B.
8	$\overline{BO2}$	FM auto tuning output terminal. "L" when FM. Auto tuning at low level at high level.
9	$\overline{BO3}$	AM band control signal output terminal. AM band at low level.
10	AMIN	AM local oscillator input terminal.
11	FMIN	FM local oscillator terminal.
12	$V_{DD}1$	Power supply terminal for back-up.
13	$V_{DD}2$	Power supply terminal.
14	PD1	Charge pump output of the phase detector which constitutes the PLL. High level is output when the divided local oscillator frequency is high than the reference frequency. In the opposite case, low level is output. Floating occurs when the frequencies matched. The output is applied to the variable capacitor diode in the local oscillator through the low pass filters.
15	PD2	
16	Vss	Ground terminal.

FIP15AMW26 (FLUORESCENT INDICATOR TUBE)



Terminal No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Electrode	F	NP	S1	S2	S3	S4	S5	S6	j	i	NP	h	NP	g	f	NP	e

(Left)

Terminal No.	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Electrode	d	c	b	a	NP	NP	NP	14G	NP	13G	12G	11G	10G	9G	8G	7G	6G

Terminal No.	35	36	37	38	39	40	41	42	43
Electrode	5G	4G	3G	2G	1G	NP	NP	NP	F

(Right)

F : Filament
G : Grid
NP : No pin
a~j/1G~14G : Anode

Segment \ Digit	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1
Sa	TAPE-2	1th	a	a	a	a	a	a	a	a	a	SLEEP	a	a
Sb	TAPE-1	2nd	b	b	b	b	b	b	b	b	b	kHz	b	b
Sc	VCR	3rd	c	c	c	c	c	c	c	c	c	MHz	c	c
Sd	VDP	4th	d	d	d	d	d	d	d	d	d		d	d
Se	TUNER	5th	e	e	e	e	e	e	e	e	e		e	e
Sf	PHONO	ON	f	f	f	f	f	f	f	f	f	—	f	f
Sg	CD	OFF	g	g	g	g	g	g	g	g	g	VCR	g	g
Sh	SOURCE	FINE										VDP	1-10(A)	dB
Si	REC SEL	STEREO										TAPE-2	11-20(B)	MIN
Sj		FM MUTE										DIRECT	MEMORY	CH

ADJUSTMENT PROCEDURES

Preparation

- **Input**

FM mono: 1kHz, 75kHz devi., 60dB/μV
FM stereo: 1kHz, L+R 67.5kHz devi.: Pilot signal 19kHz 7.5kHz devi.
AM: 400Hz, 30% mod.,

- **Output**

Connect the non-inductive type resistor of 8 ohms to the speaker terminal A of left and right channels unless otherwise noted.

- **Standard knob position**

TAPE MONITOR . . . . . SOURCE
VOLUME . . . . . Maximum
BASS/TREBLE/BALANCE . . . . . Center
MODE . . . . . STEREO
SPEAKER. . . . . A
SIMULATED STEREO. . . . . OFF
DYNAMIC, BASS EXPANDER. . . . . OFF
SELECTIVE TONE CONTROL. . . . . OFF
MUTING/LOUDNESS . . . . . OFF
CARTRIDGE SELECTOR. . . . . MM
REC SELECTOR. . . . . SOURCE

Amplifier section

1. Idling current adjustment

Connect the DC voltmeter to the terminals I ID and V CT on the power amplifier pc board.
Adjust the semi-fixed resistors R531 and R532 so that the indication of voltmeter is 15±2mV.
Notes: VOLUME . . . . . Maximum, Open load,
Adjust after switching on for 15minutes.

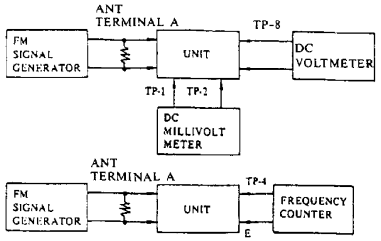
2. Check of operation of protection circuit.

1) Check of operation of protection relay.
   (1) Confirm that the relay turns ON approximately 5 seconds after the power switch is turned ON.
   (2) The relay should turn OFF approximately 0.5 seconds after the power switch is turned OFF.
2) Check of DC detection
   (1) Turn the power on with no load.
   (2) After the speaker relay turns ON, apply DC1~1.5V to the CD input terminals. Confirm that the relay turns OFF.
   (3) Confirm that operation is the same as (2) above when an input of DC−1~−1.5V is applied.

Note) Under no circumstances connect a load or short the speaker terminals when performing the above test.

FM section

Item	Step	Connection of instrument	FM SG output	Stereo modulator output	Turning dial setting	Output indicator	Adjustment	Adjust for	Remarks
FM IF	1	Fig. 1	99.1MHz 1kHz, 75kHz devi. 65dBf (60dB)	–	99.1MHz	DC milivolt meter	L101	0V ± 20mV	Muting switch: OFF Repeat the steps 1 and 3 until no further adjustment is necessary
	2					DC voltmeter	IF on the front end	Maximum	
	3					Distortion analyzer	L102	Minimum	
VCO		Fig. 2	99.1MHz 1kHz, 75kHz devi. 65dBf (60dB)	–	99.1MHz	Frequency counter	R201	76kHz ± 40Hz	
Stereo Distortion		Fig. 3	99.1MHz 65dBf (60dB) Ext. modulation	L or Rch. 1kHz	99.1MHz	Distortion analyzer	IF on the front end	Minimum	Don't turn more than ± 180°.
Stereo Separation	1	Fig. 3	99.1MHz 65dBf (60dB) Ext. modulation	Lch. 1kHz	99.1MHz	Rch. AC voltmeter	R202	Minimum	Maximum and same separation
	2			Rch. 1kHz		Lch. AC voltmeter		Minimum	
Muting level	1	Fig. 3	99.1MHz 19.2dBf(14dB) Ext. modulation	–	99.1MHz	Auto indicator	R101	Light on	Muting switch: ON
	2		99.1MHz 18.2dBf(13dB) Ext. modulation					Light off	
Signal indicator level		Fig. 3	99.1MHz 45.2dBf(40dB) 1kHz, 75kHz devi.	–	99.1MHz	5th Signal indicator	R102	Light on	



Use the high impedance probe. (10 : 1)

Fig. 2

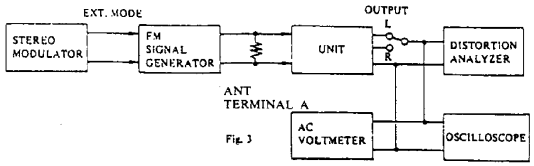
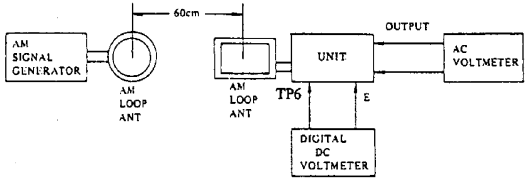


Fig. 3

AM section

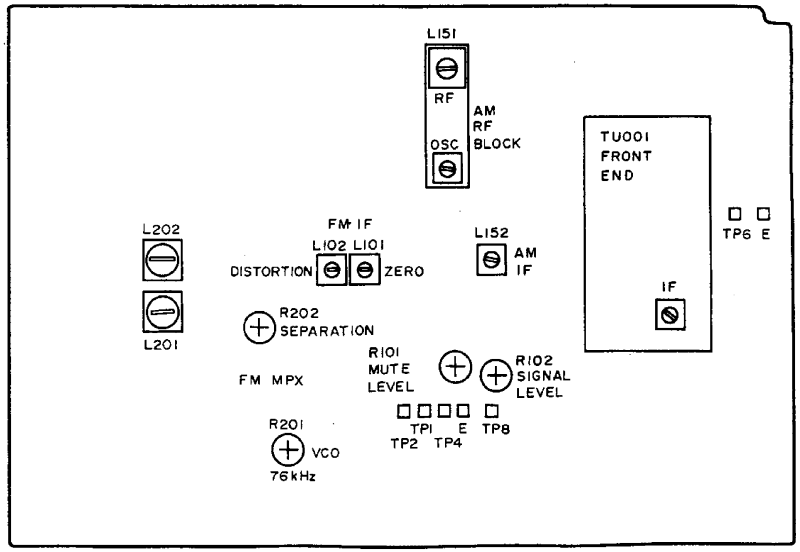
Step	AM SG output	Tuned frequency	Output indicator	Adjustment point	Adjust for
1		530kHz (531kHz)	Digital DC voltmeter	OSC on RF block	1.3V ± 0.1V
2	600kHz(603kHz) 400Hz 30% mod. 60dB/m	600kHz (603kHz)	AC voltmeter	RF on RF block	Maximum
3	1000kHz (999kHz) 400Hz 30% mod. 60dB/m	1000kHz (999kHz)	AC voltmeter	L152	Maximum

( ) : 9kHz step model

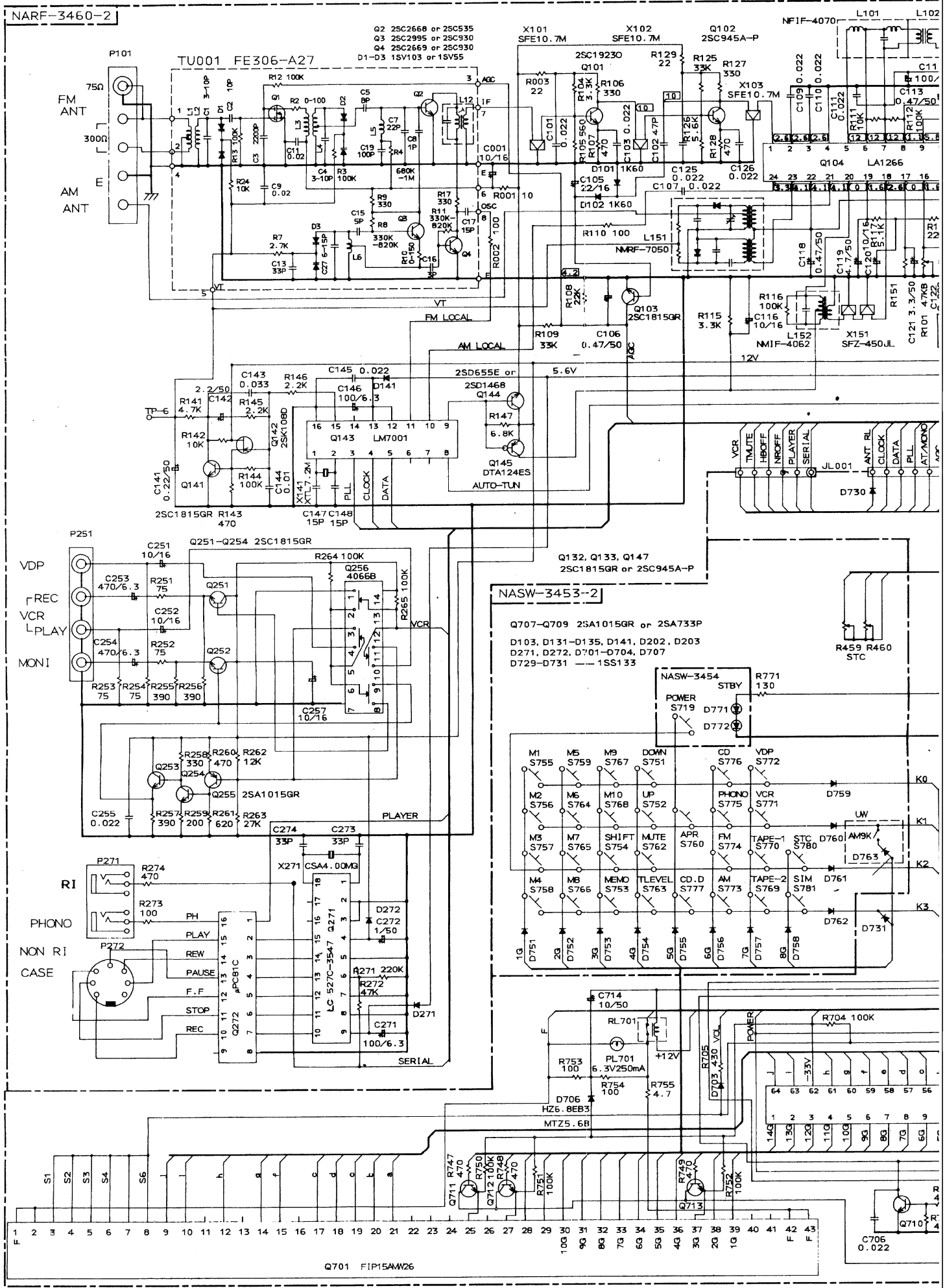


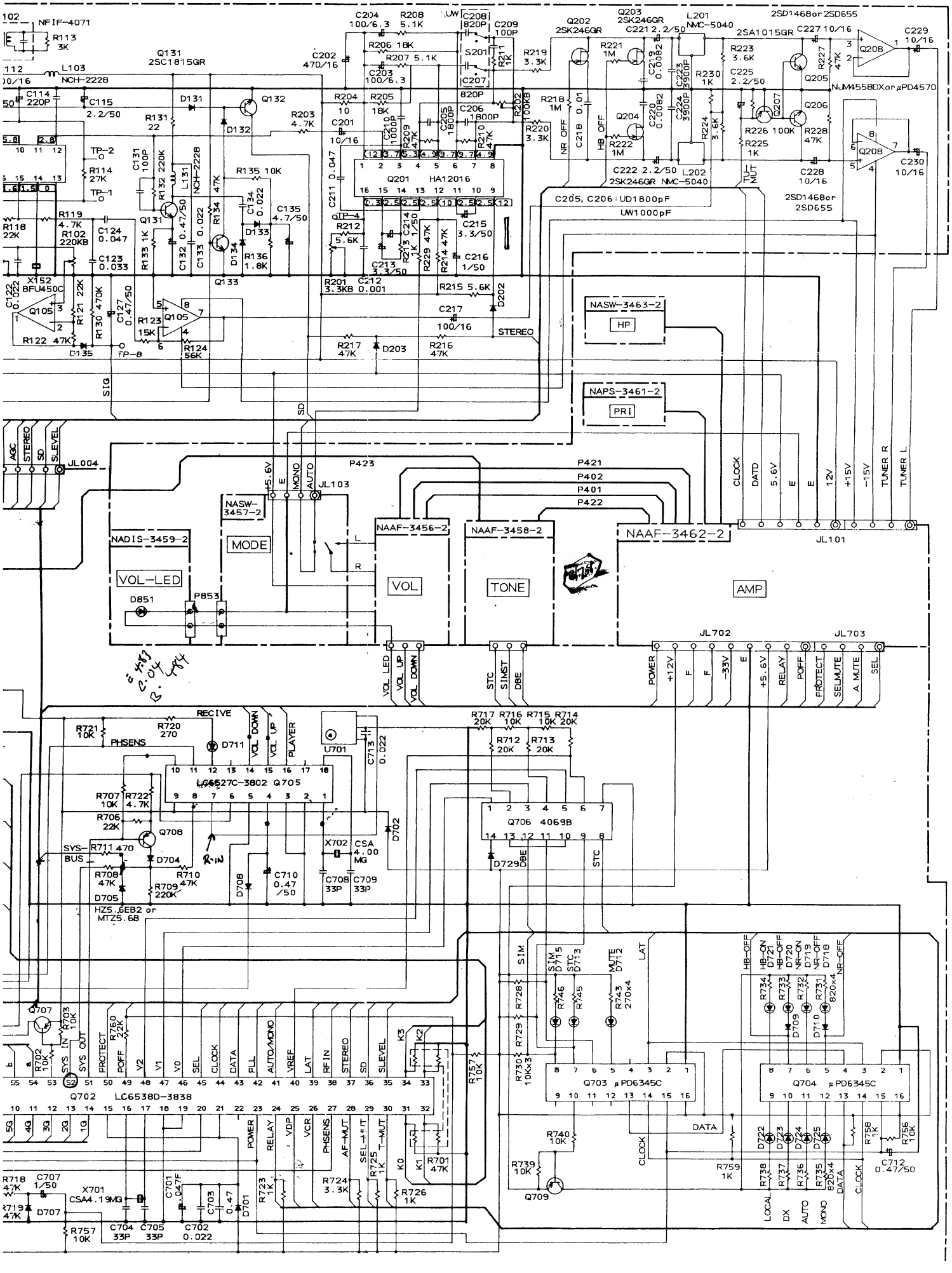
Reference specifications

FM Tuned voltage (TP-6)	87.5MHz 1.5±0.5V 108.0MHz 8.0±0.5V
Signal meter voltage (TP-8) 98MHz 60dBμ	more than 4V
Auto stop level	AM : Less than 62dB/m FM : 14±3dBμ
Hi-blend switching level	33±5dBμ
NR switching level	17±5dBμ
DX/LOCAL switching level	60±8dBμ
AM Tuned voltage (TP-6)	530kHz 1.3±0.5V 1620kHz 8.0±0.5V



SCHEMATIC DIAGRAM

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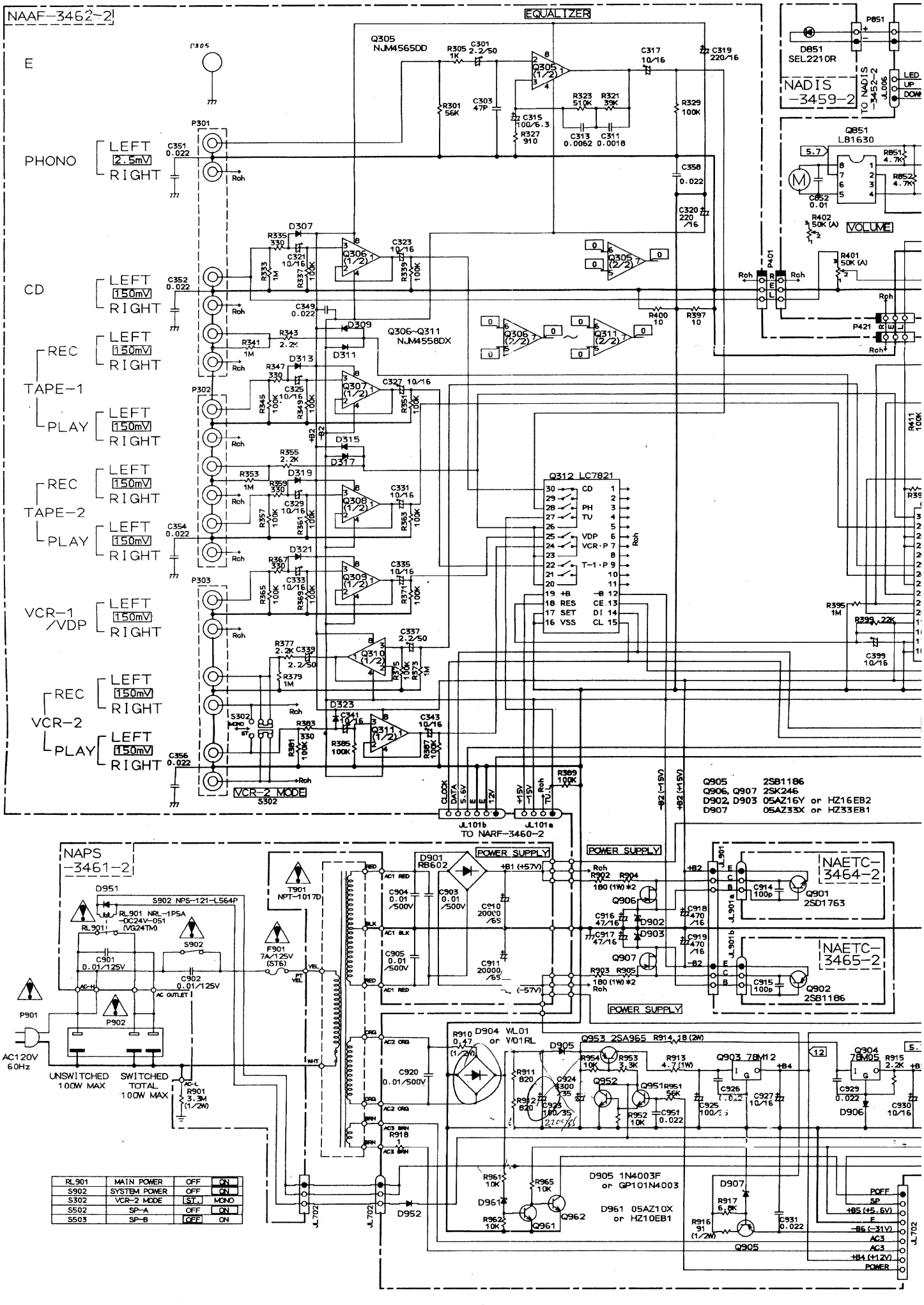
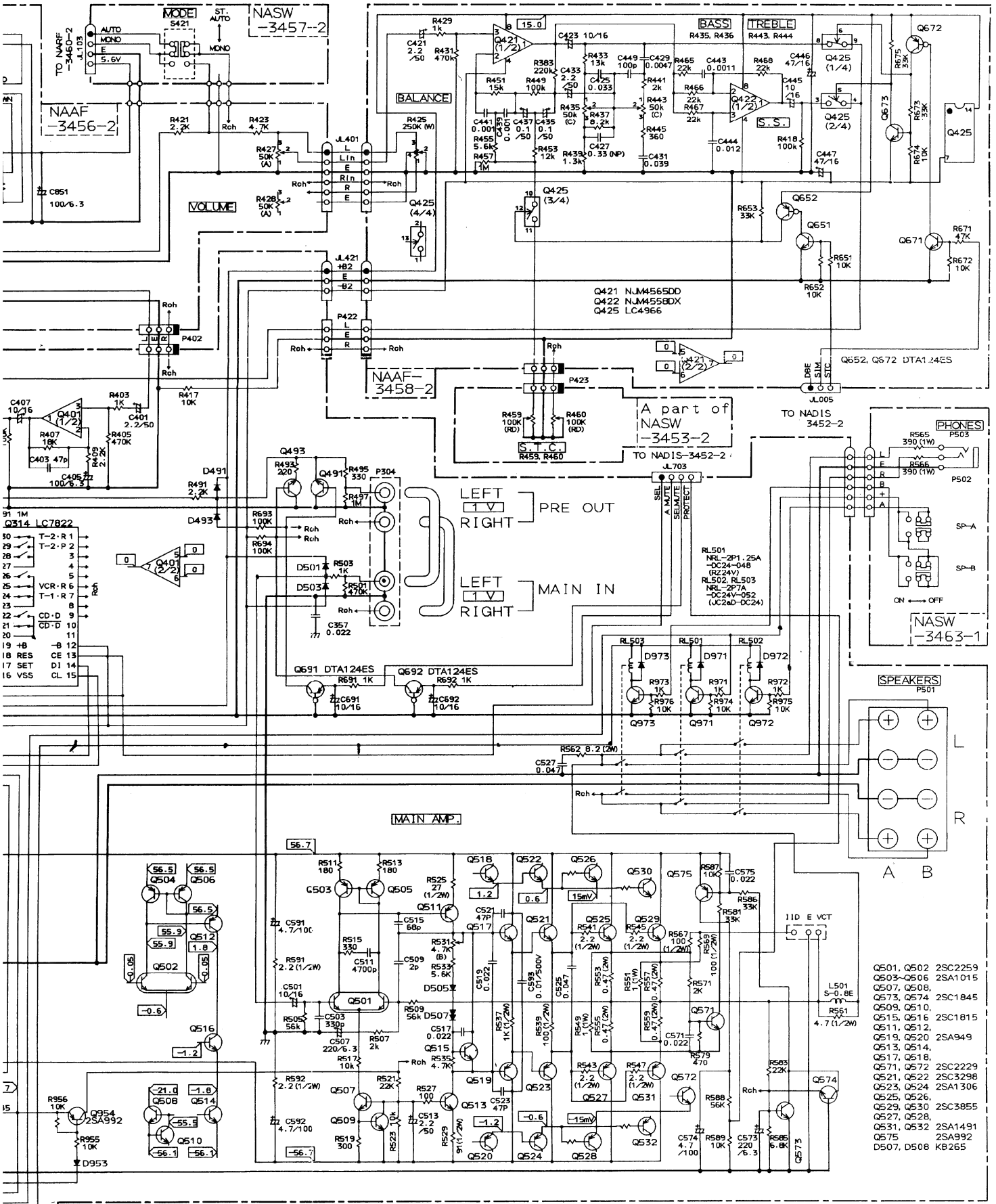
Q131 2SC1815GR
L103 NCH-2228
Q132
D131
D132
Q133
Q105 HA12016
X152 BFU450C
Q201 HA12016
Q202 2SK246GR
Q203 2SK246GR
L201 NMC-5040
L202 2SK246GR NMC-5040
2SA1015GR
2SD1468or2SD655
NJM4558DXorμPD4570
C205, C206 : UD1800pF
UW1000pF
NASW-3463-2
HP
NAPS-3461-2
PRI
JL004
JL103
JL101
JL702
JL703
P423
P421
P402
P401
P422
NASW-3457-2
MODE
NADIS-3459-2
VOL-LED
D851
P853
NAAF-3456-2
VOL
NAAF-3458-2
TONE
NAAF-3462-2
AMP
STEREO
SIG
SD
SLEVEL
AGC
TUNER R
TUNER L
RECIVE
PHSENS
VOL DOWN
VOL UP
PLAYER
U701
LC6527C-3802 Q705
Q706 4069B
Q708
D704
D705
HZ5.6EB2 or MTZ5.68
D711
D729
X702 CSA 4.00 MG
SYS-BUS
R-IN
Q707
Q702 LC6538D-3838
X701 CSA4.19MG
Q703 μPD6345C
Q704 μPD6345C
Q709
D722
D723
D724
D725
S1M
MUTE
LAT
STC
DBE
HB-OFF
NR-OFF
DATA
CLOCK
LOCAL
DX
AUTO
MONO

SCHEMATIC DIAGRAM





-NOTES-

- ALL RESISTORS ARE IN OHMS 1/4 WATTS UNLESS OTHERWISE NOTED
- ALL CAPACITORS ARE IN μF/50V UNLESS OTHERWISE NOTED
- ELECTROLYTIC CAPACITORS (-#-) ARE IN μF/WV
- ALL DIODES ARE 1SS133 UNLESS OTHERWISE NOTED.
- ALL PNP TRANSISTORS ARE 2SA1015-GR or 2SA733-P UNLESS OTHERWISE NOTED.
- ALL NPN TRANSISTORS ARE 2SC1815-GR or 2SC945A-P UNLESS OTHERWISE NOTED.
- THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR SAFETY. REPLACE ONLY WITH PART NUMBER SPECIFIED.
- VOLTAGE (MEASURED WITH V.T.V.M.) ⊂⊃V IS DC VOLTAGE (NO INPUT SIGNAL).
- CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.

LC7821
LC7822

LC4966

NJM4558DX
NJM4565DD
LB1630

78M05
78M12

2SA1306
2SB1186
2SC3298
2SD1763

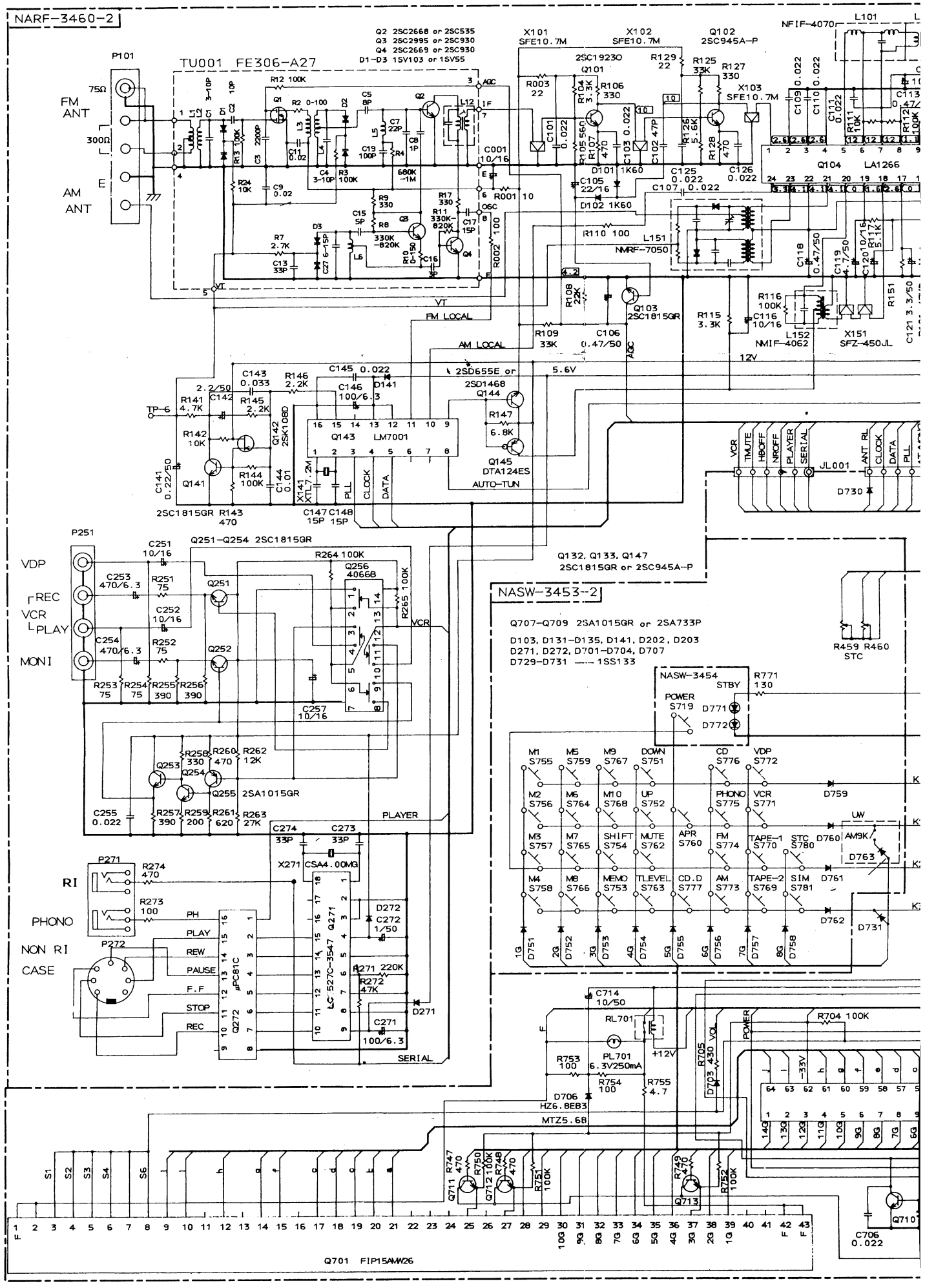
2SA1491
2SC3855

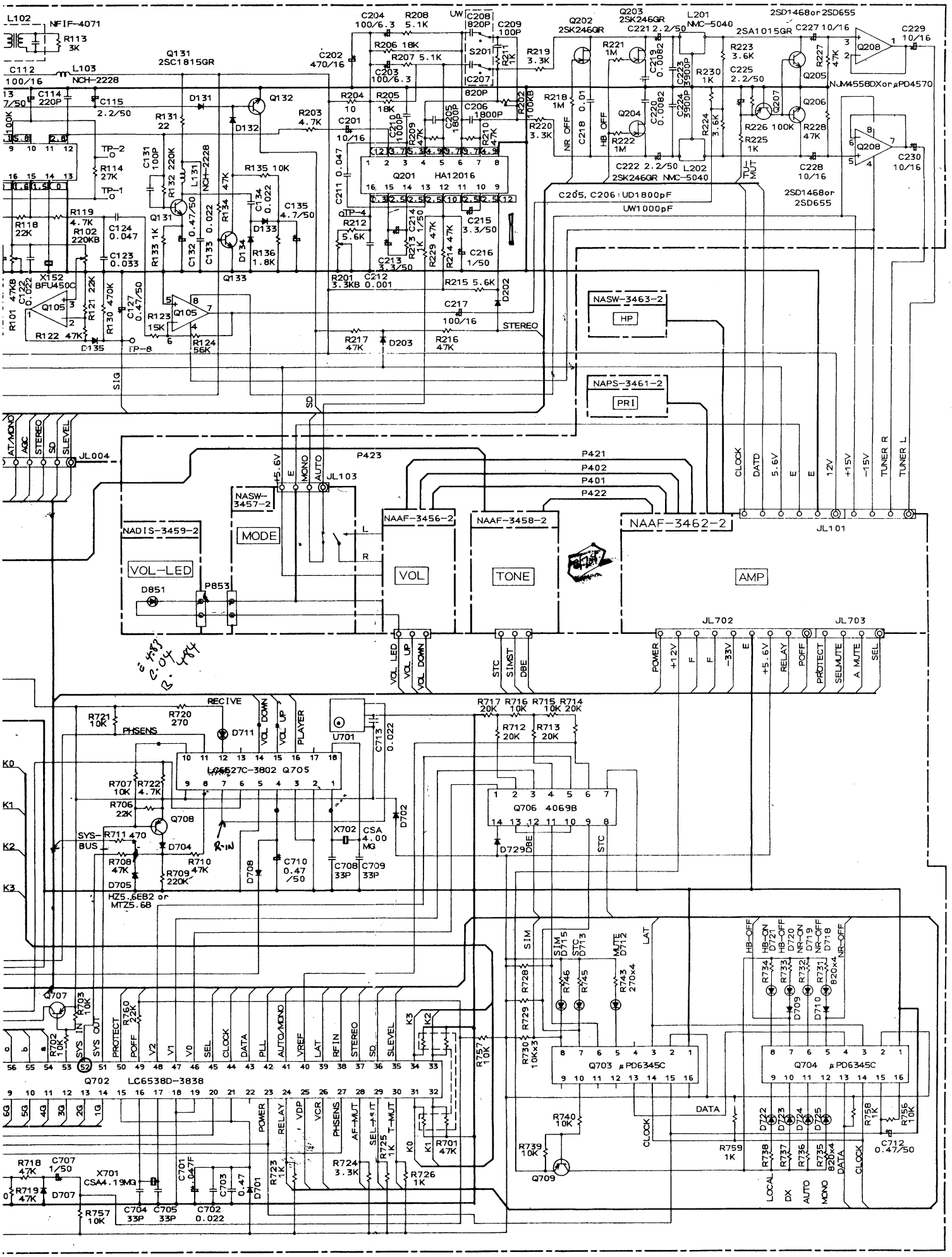
2SA949
2SA965
2SC2229

2SA733
2SA992
2SA1015
2SC945A
2SC1815
2SC1845
2SC2878

DTA124ES 2SK246 2SC2259

TO NADIS-3452-2


NARF-3460-2
NASW-3453-2
TU001 FE306-A27
P101
FM ANT
AM ANT
Q2 2SC2668 or 2SC535
Q3 2SC2995 or 2SC930
Q4 2SC2669 or 2SC930
D1-D3 1SV103 or 1SV55
X101 SFE10.7M
X102 SFE10.7M
Q102 2SC945A-P
X103 SFE10.7M
NFIF-4070
L101
Q104 LA1266
D101 1K60
D102 1K60
L151 NMRF-7050
Q103 2SC1815GR
L152 NMIF-4062
X151 SFZ-450JL
VT
FM LOCAL
AM LOCAL
AGC
12V
5.6V
2SD655E or 2SD1468
Q144
Q143 LM7001
Q145 DTA124ES
AUTO-TUN
Q141
2SC1815GR R143 470
C147 C148 15P 15P
PLL
CLOCK
DATA
VCR
TMUTE
HBOFF
NROFF
PLAYER
SERIAL
ANT RL
JL001
D730
P251
VDP
REC
VCR PLAY
MONI
Q251-Q254 2SC1815GR
Q256 4066B
VCR
Q253
Q254
Q255 2SA1015GR
PLAYER
X271 CSA4.00MG
P271
RI
PHONO
NON RI
CASE
P272
PH
PLAY
REW
PAUSE
F.F
STOP
REC
μPC81C Q272
LC5270-3547 Q271
SERIAL
Q132, Q133, Q147
2SC1815GR or 2SC945A-P
Q707-Q709 2SA1015GR or 2SA733P
D103, D131-D135, D141, D202, D203
D271, D272, D701-D704, D707
D729-D731 1SS133
R459 R460
STC
NASW-3454
STBY
POWER
S719
D771
D772
R771 130
M1 S755
M5 S759
M9 S767
DOWN S751
CD S776
VDP S772
M2 S756
M6 S764
M10 S768
UP S752
PHONO S775
VCR S771
D759
M3 S757
M7 S765
SHIFT S754
MUTE S762
APR S760
FM S774
TAPE-1 S770
STC S780
D760
AM9K
D763
M4 S758
M8 S766
MEMO S753
TLEVEL S763
CD.D S777
AM S773
TAPE-2 S769
SIM S781
D761
D762
D731
D751
D752
D753
D754
D755
D756
D757
D758
C714 10/50
RL701
PL701 6.3V250mA
+12V
-35V
R704 100K
R705 430
D703
D706 HZ6.8EB3
MTZ5.6B
Q711
Q712
Q713
Q710
C706 0.022
Q701 FIP15AM26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NFIF-4071
R113 3K
C112 100/16
L103 NCH-2228
Q131 2SC1815GR
C114 220P
C115 2.2/50
D131
Q132
D132
R131 22
R203 4.7K
C202 470/16
C204 100/6.3
R208 5.1K
R206 18K
R207 5.1K
C203 100/6.3
C208 820P
C209 100P
S201
R211 1K
C207
820P
C206 1800P
R202 100KB
R219 3.3K
Q202 2SK246GR
Q203 2SK246GR
C221 2.2/50
L201 NMC-5040
2SD1468or2SD655
2SA1015GR
C227 10/16
C229 10/16
Q208
R221 1M
C219 0.0082
C223 3900P
R223 3.6K
R227 47K
Q205
R230 1K
C225 2.2/50
NJM4558DXor μPD4570
R218 1M
C218 0.01
NR OFF
HB OFF
Q204
C220 0.0082
C224 3900P
R224 3.6K
Q207
Q206
R222 1M
R226 100K
R228 47K
R225 1K
C222 2.2/50
L202
2SK246GR NMC-5040
C228 10/16
C230 10/16
MUT
C205, C206 : UD1800pF
UW1000pF
2SD1468or
2SD655
R204 10
R205 18K
C201 10/16
C210 1000P
C209 1800P
R209 47K
R210 47K
R220 3.3K
Q201 HA12016
C211 0.047
C212 0.001
C213 3.3/50
C214 1/50
C215 3.3/50
C216 1/50
R212 5.6K
R213 1K
R214 47K
R229 47K
R201 3.3KB
R215 5.6K
D202
C217 100/16
STEREO
R217 47K
D203
R216 47K
TP-4
TP-2
TP-1
R114 27K
C131 100P
R132 220K
L131 NCH-2228
R135 10K
R134 47K
C134 0.022
C135 4.7/50
D133
D134
R136 1.8K
Q133
R119 4.7K
R118 22K
R102 220KB
C124 0.047
C123 0.033
C132 0.47/50
C133 0.022
R133 1K
Q131
X152 BFU450C
R101 47KB
C122 0.022
Q105
R121 22K
R130 470K
C127 0.47/50
R123 15K
R122 47K
D135
TP-8
R124 56K
SIG
SD
NASW-3463-2
HP
NAPS-3461-2
PRI
AT-MONO
AGC
STEREO
SD
SLEVEL
JL004
+5.6V
E
MONO
AUTO
JL103
P423
P421
P402
P401
P422
CLOCK
DATD
5.6V
E
E
12V
+15V
-15V
TUNER R
TUNER L
JL101
NASW-3457-2
NADIS-3459-2
MODE
L
R
NAAF-3456-2
NAAF-3458-2
NAAF-3462-2
VOL-LED
D851
P853
VOL
TONE
AMP
JL702
JL703
VOL LED
VOL UP
VOL DOWN
STC
SIMST
DBE
POWER
+12V
F
F
-33V
E
+5.6V
RELAY
POFF
PROTECT
SELMUTE
A MUTE
SEL
RECIVE
R721 10K
R720 270
PHSENS
D711
VOL DOWN
VOL UP
PLAYER
U701
C713 0.022
R717 20K
R716 10K
R715 10K
R714 20K
R712 20K
R713 20K
LC65527C-3802 Q705
K0
K1
K2
K3
R707 10K
R722 4.7K
R706 22K
Q708
SYS-BUS
R711 470
D704
R708 47K
R709 220K
R710 47K
D705
HZ5.6EB2 or MTZ5.6B
R-IN
D708
C710 0.47/50
X702 CSA 4.00 MG
C708 33P
C709 33P
D702
Q706 4069B
D729
DBE
STC
Q707
R703 10K
R702 10K
SYS IN
SYS OUT
PROTECT
R760 22K
POFF
V2
V1
V0
SEL
CLOCK
DATA
PLL
AUTO/MONO
VREF
LAT
RFIN
STEREO
SD
SLEVEL
K3
K2
K1
K0
R757 10K
Q702 LC6538D-3838
POWER
RELAY
VDP
VCR
PHSENS
AF-MUT
SEL-MUT
T-MUT
R725 1K
R724 3.3K
R723 1K
R726 1K
R701 47K
R718 47K
C707 1/50
X701 CSA4.19MG
C701 0.047F
C703 0.47
C702 0.022
C704 33P
C705 33P
D701
D707
R719 47K
R757 10K
SIM
STC D713
MUTE D712
LAT
R728
R729
R730 10K×3
R746
R745
R743 270×4
Q703 μPD6345C
HB-OFF
HB-ON D721
HB-OFF D720
NR-ON D719
NR-OFF D718
NR-OFF
R734
R733
R732
R731 820×4
D709
D710
Q704 μPD6345C
R740 10K
R739 10K
Q709
DATA
CLOCK
R722
R723
R724
R725
D722
D723
D724
D725
R758 1K
R756 10K
R759 1K
C712 0.47/50
R738
R737
R736
R735 820×4
LOCAL
DX
AUTO
MONO
DATA
CLOCK

PRINTED CIRCUIT BOARD-PARTS LIST

FM/AM TUNER PC BOARD (NARF-3460-2/2A)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Front end	
TU001	240080	FE306-A27
	ICs	
Q104	22240214	LA1266A
Q105	222502 or 22240050	NJM4558DX or μPC4570C
Q143	22240090	LM7001
Q201	222593	HA12016
Q208	222502 or 22240050	NJM4558DX or μPC4570C
Q256	222840661	4066B
Q271	22240145	LC6527C-3547
Q272	222807	μPA81C
	Transistors	
Q101	2211723	2SC1923-O
Q102	2210746	2SC945A-P
Q103, Q131	2211255	2SC1815-GR
Q132, Q133	2211255 or	2SC1815-GR or
Q147	2210746	2SC945A-P
Q141	2211255	2SC1815-GR
Q142	2212294	2SK108-D
Q144	2211705,	2SD655-E,
Q205, Q206	2211706 or	2SD655-F or
	2212794	2SD1468-R
Q145	2212600	DTA124ES
Q202-Q204	2211945	2SK246-GR
Q207	2211455 or 2210803	2SA1015-GR or 2SA733-P
Q251-Q254	2211255	2SC1815-GR
Q255	2211455	2SA1015-GR
	Diodes	
D101, D102	223132	1K60
D131-D135	223163	1SS133
D141	223163	1SS133
D202, D203	223163	1SS133
D271, D272	223163	1SS133
	Transformers	
L101	233396	NFIF-4070
L102	233397	NFIF-4071
L152	232139	NMIF-4062
	Coils	
L103	233400K033	NCH-2228
L131	231081	NCH-2129
L201, L202	233294	NMC-5040
	RF block	
L151	232148	NMRF-7050
	Ceramic filters	
X101, X102	3010137	SFE10. 7MMK
X103	3010006	SFE10. 7MA8
X151	3010123	SFZ450JL
X152	3010076	BFU450C
	OSC element	
X141	3010141	XTL7. 2M, X'tal
X271	3010099	CSA4. 00MG, Ceramic
	Capacitors	
C001	354741009	10μF, 16V, Elect.
C105	354742209	22μF, 16V, Elect.
C106, C113	354784799	0.47μF, 50V, Elect.
C112	354741019	100μF, 16V, Elect.
C115	354780229	2.2μF, 50V, Elect.
C116	354741009	10μF, 16V, Elect.

CIRCUIT NO.	PART NO.	DESCRIPTION
	Capacitors	
C118	354784799	0.47μF, 50V, Elect.
C119	354780479	4.7μF, 50V, Elect.
C120	354741009	10μF, 16V, Elect.
C121	354780339	3.3μF, 50V, Elect.
C123	371123334	0.033μF±5%, 50V, Mylar
C124	371124734	0.047μF±5%, 50V, Mylar
C127, C132	354784799	0.47μF, 50V, Elect.
C135	354780479	4.7μF, 50V, Elect.
C141	354782299	0.22μF, 50V, Elect.
C142	354780229	2.2μF, 50V, Elect.
C143	371123334	0.033μF±5%, 50V, Mylar
C144	371121034	0.01μF±5%, 50V, Mylar
C146	354721019	100μF, 6.3V, Elect.
C201	354741009	10μF, 16V, Elect.
C202	354744719	470μF, 16V, Elect.
C203, C204	354721019	100μF, 6.3V, Elect.
C205, C206	371121824	1800pF±5%, 50V, Mylar〈D〉
	371121024	1000pF±5%, 50V, Mylar〈W〉
C207, C208	370138214	820pF±5%, 100V, APS〈W〉
C211	371124734	0.047μF±5%, 50V, Mylar
C212	370131024	1000pF±5%, 100V, APS
C213, C215	354780339	3.3μF, 50V, Elect.
C214, C216	354780109	1μF, 50V, Elect.
C217	354741019	100μF, 16V, Elect.
C218	371121034	0.01μF±5%, 50V, Mylar
C219, C220	371128224	8200pF±5%, 50V, Mylar
C221, C222	354780229	2.2μF, 50V, Elect.
C223, C224	371123924	3900pF±5%, 50V, Mylar
C225	354780229	2.2μF, 50V, Elect.
C227-C230	354741009	10μF, 16V, Elect.
C251, C252	354741009	10μF, 16V, Elect.
C253, C254	354724719	470μF, 6.3V, Elect.
C257	354741009	10μF, 16V, Elect.
C271	354721019	100μF, 6.3V, Elect.
C272	354780109	1μF, 50V, Elect.
	Resistors	
R101	5210068	N06HR47KBD, Semi-fixed, FM mute level
R102	5210072	N06HR220KBD, Semi-fixed, FM signal level
R201	5210061	N06HR3.3KBD, Semi-fixed, VCO
R202	5210070	N06HR100KBD, Semi-fixed, Separation
	Terminals	
P101	25060091	NTM-3PDMN32, Antenna
P251	25045216	NPJ-4PDBL94, Output VIDEO
P271	25045172	HSJ1003-01-020, Phono/RI
P272	25050294	NSCT-8P-121, Tape DIN
	Sockets	
JL103	25050268	NSCT-4P-96
JL001	25050270	NSCT-6P-98
JL004	25050272	NSCT-8P-100
JL101	25050274	NSCT-10P-102
	Bracket	
	27141059	Ground

NOTE : 〈D〉 : Only 120V model
〈W〉 : Only Worldwide model

PRINTED CIRCUIT BOARD-PARTS LIST

DISPLAY CIRCUIT PC BOARD (NADIS-3452-2)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Remote sensor	
U701	24130001	GP1U501S
	Lamp	
Q700	210064A	PL6. 3V, 250mA
	Fluorescent tube	
Q701	212069	FIP15AMW26
	ICs	
Q702	22240210	LC6538D-3838
Q703, Q704	22240211	μPD6345C
Q705	22240194	LC6527C-3802
Q706	222840692	4069UB
	Transistors	
Q707-Q709	2211455 or 2210803	2SA1015-GR or 2SA733-P
Q710-Q713	2211255 or 2210746	2SC1815-GR or 2SC945A-P
D701-D704	223163	1SS133
D705	224150562, 224650562 or 224450562	05AZ5. 6Y, HZ5. 6EB2 or MTZ5. 6B
D706	224150752, 224650752 or 224450752	05AZ7. 5Y, HZ7. 5EB2 or MTZ7. 5B
D707-D710	223163	1SS133
D729-D731	223163	1SS133
	L. E. Ds	
D711, D712	225141	SEL2213C
D713, D715 D718, D720 D722, D724	225137CG, 225137DG or 225137DY	SEL2413E-CG, SEL2413E-DG or SEL2413E-DY
D719, D721	225142	SEL2913K
D723, D725	225142	SEL2913K
	OSC elements	
X701	3010133	CSA4. 19MG, Ceramic
X702	3010099	CSA4. 00MG, Ceramic
	Capacitors	
C701	3000051	0.047F, 5. 5V, Super for memory prevention
C703	375524744	0.47μF ±5%, 50V, Plastic(MMT)
C707	353780109	1 μF, 50V, Elect.
C710, C712	353784799	0.47μF, 50V, Elect.
C714	353781009	10μF, 50V, Elect.
	Resistor	
R701	49163473404	47kohm×4, 1/10W, Network
	Relay	
RL701	25065298	NRL-1P1A-DC12-40
	Holder	
	27190682	LED

OPERATION SWITCH PC BOARD (NASW-3453-2/2A)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Diodes	
D751-D762	223163	1SS133
D763	223163	1SS133〈W〉
	Variable resistor	
R459	6112008	N30LGL100KRD5Z
	Push switches	
S751-S777	25035548	NPS-111-S510
S780, S781	25035548	NPS-111-S510

STAND-BY SWITCH PC BOARD (NASW-3454-2)

CIRCUIT NO.	PART NO.	DESCRIPTION
D771, D772	225142	SEL2913K, L. E. Ds
S771	25035548	NPS-111-S510, Power switch
	27190454A	Holder, LED

AM BAND STEP SELECTOR PC BOARD (NASW-3455-2)
〈Only Worldwide model〉

CIRCUIT NO.	PART NO.	DESCRIPTION
S775	25065267	NSS-22109, Band step switch

DE-EMPHASIS SWITCH PC BOARD (NASW-3467-2)
〈Only Worldwide model〉

CIRCUIT NO.	PART NO.	DESCRIPTION
	25065267	NSS-22109, De-emphasis switch

NOTE : 〈D〉 : Only 120V model
〈W〉 : Only Worldwide model

PRINTED CIRCUIT BOARD-PARTS LIST

PRE. AND POWER AMPLIFIER PC BOARD (NAAF-3462-2)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Transistors	
Q491-Q494	2212285 or	2SC2878-A or
	2212286	2SC2878-B
Q501, Q502	2211371 or	2SC2259-O-001 or
	2211372	2SC2259-O-002
Q503-Q506	2211455	2SA1015-GR
Q507, Q508	2211732 or	2SC1845-F or
	2211733	2SC1845-E
Q509, Q510	2211255	2SC1815-GR
Q511, Q512	2211353 or	2SA949-O or
	2211354	2SA949-Y
Q513, Q514	2211633 or	2SC2229-O or
	2211634	2SC2229-Y
Q515, Q516	2211255	2SC1815-GR
Q517, Q518	2211633 or	2SC2229-O or
	2211634	2SC2229-Y
Q519, Q520	2211353 or	2SA949-O or
	2211354	2SA949-Y
Q521, Q522	2201643 or	2SC3298-O or
	2201644	2SC3298-Y
Q523, Q524	2201633 or	2SA1306-O or
	2201634	2SA1306-Y
Q525, Q526	2201703,	2SC3855-O, #
Q529, Q530	2201704 or	2SC3855-Y or
	2201706	2SC3855-P
Q527, Q528	2201693,	2SA1491-O, #
Q531, Q532	2201694 or	2SA1491-Y or
	2201696	2SA1491-P

NOTE : Replacement for transistor of mark #, if necessary, must be made from the same beta group (HFE) as the original type.

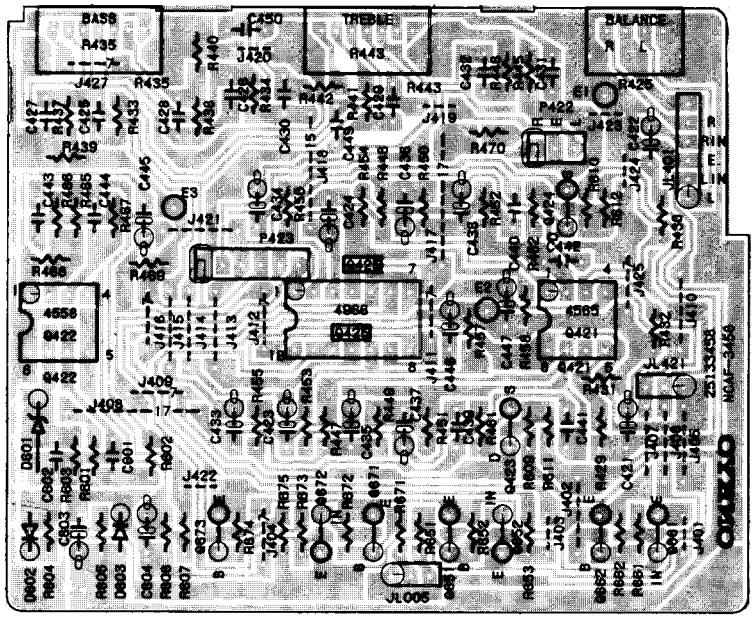
Ex. 2SC3855-O 2SA1491-O

Same beta group

Q571, Q572	2211633 or	2SC2229-O or
	2211634	2SC2229-Y
Q573, Q574	2211732 or	2SC1845-F or
	2211733	2SC1845-E
Q575	2211792 or	2SA992-F or
	2211793	2SA992-E
Q691, Q692	2212600	DTA124ES
Q905	2201934,	2SB1186-D,
	2201935 or	2SB1186-E or
	2201936	2SB1186-F
Q906, Q907	2211945	2SK246-GR
Q951, Q952	2211255 or	2SC1815-GR or
	2210746	2SC945A-P
Q953	2211643 or	2SA965-O or
	2211644	2SA965-Y
Q954	2211792 or	2SA992-F or
	2211793	2SA992-E
Q961, Q962	2211255 or	2SC1815-GR or
	2210746	2SC945A-P
Q971-Q973	2211255	2SC1815-GR
	ICs	
Q306-Q311	222502	NJM4558DX
Q312	22240079	LC7821
Q314	22240081	LC7822
Q305, Q401	22240191	NJM4565DD
Q903	222780122NEC	78M12
Q904	222780052NEC	78M05
	Diodes	
D301-D302	223163	1SS133
D307-D324	223163	1SS133
D491-D494	223163	1SS133
D501-D506	223163	1SS133
D507, D508	4000120	KB265
D902, D903	224151602 or	05AZ16Y or
	224651602	HZ16EB2
D904	223862 or	WL01 or
	223890	W01RL
D905	223880 or	GP101N4003 or
	223896	1N4003F
D906	223163	1SS133
D907	224153301 or	05Z33X or
	224653301	HZ33EB1
D952, D953	223163	1SS133
D961	224151001 or	05AZ10X or
	224651001	HZ10EB1
D971-D973	223163	1SS133
	Capacitors	
C301, C302	354780229	2.2μF, 50V, Elect.
C311, C312	371121824	1800pF$\pm$5%, 50V, Mylar
C313, C314	371126224	6200pF$\pm$5%, 50V, Mylar
C315, C316	354721019	100μF, 6.3V, Elect.
C317, C318	354741009	10μF, 16V, Elect.
C319, C320	354742219	220μF, 16V, Elect.
C321-C336	354741009	10μF, 16V, Elect.
C337-C340	354780229	2.2μF, 50V, Elect.
C341-C348	354741009	10μF, 16V, Elect.
C399	354741009	10μF, 16V, Elect.
C401, C402	354780229	2.2μF, 50V, Elect.
C405, C406	354721019	100μF, 6.3V, Elect.
C407, C408	354741009	10μF, 16V, Elect.
C501, C502	354741009	10μF, 16V, Elect.
C507, C508	354722219	220μF, 6.3V, Elect.
C513, C514	354780229	2.2μF, 50V, Elect.
C525-C528	371124734	0.047μF$\pm$5%, 50V, Mylar
C573	354722219	220μF, 6.3V, Elect.
C574	354790479	4.7μF, 100V, Elect.
C591, C592	354790479	4.7μF, 100V, Elect.
C691, C692	354741009	10μF, 16V, Elect.
C916, C917	354744709	47μF, 16V, Elect.
C918, C919	354744719	470μF, 16V, Elect.
C920	335251039	0.01μF, 500V, Ceramic
C923	354761019	100μF, 35V, Elect.
C924	354763329	3300μF, 35V, Elect.
C925	354761019	100μF, 35V, Elect.
C927, C930	354741009	10μF, 16V, Elect.
	Resistors	
R525, R526	442522704	27ohm, 1/2W, Metal oxide film
R529, R530	442529104	91ohm, 1/2W, Metal oxide film
R531, R532	5210062	N06HR4.7KBD, Semi-fixed, Idling
R537, R538	442521024	1kohm, 1/2W, Metal oxide film
R539, R540	442521014	100ohm, 1/2W, Metal oxide film
R541-R548	442520224	2.2ohm, 1/2W, Metal oxide film
R549-R552	441620104	1ohm, 1W, Metal oxide film
R553-R560	4000063 or	0.47ohm, 2W, Metal plate
	4500009	
R561, R562	441520474	4.7ohm, 1/2W, Metal oxide film
R563, R564	441720824	8.2ohm, 2W, Metal oxide film
R567-R570	442521014	100ohm, 1/2W, Metal oxide film
R591, R592	442520224	2.2ohm, 1/2W, Metal oxide film
R902-R905	441621814	180ohm, 1W, Metal oxide film
R910	442524794	0.47ohm, 1/2W, Metal oxide film
R913	441620474	4.7ohm, 1W, Metal oxide film
R914	441721804	18ohm, 2W, Metal oxide film
R916	442529104	91ohm, 1/2W, Metal oxide film

CIRCUIT NO.	PART NO.	DESCRIPTION
	Coils	
L501, L502	231134	S-0.8E
	Switch	
S302	25065286	NSS-22112, Mode VCR
	Relaies	
RL501	25065342	NRL-2P1.25A-DC24-048, Headphone
RL502, RL503	25065360	NRL-2P7A-DC24V-052, Speaker
	Terminal	
P301	25045252	NPJ-6PDBL-124
P302, P303	25045213	NPJ-6PDBL-92
P304	25045171	NPJ-4PDBL-65
P501	25060125	NTM-8PDMN058
	Plugs	
P401a, P402a	25055133	NPLG-3P117

CIRCUIT NO.	PART NO.	DESCRIPTION
	Plugs	
P422a	25055133	NPLG-3P117
	Sockets	
P421	2000931	NSAS-6P884
JL421	25050267	NSCT-3P95
JL702	25050273	NSCT-9P101
JL703	25050268	NSCT-4P96
JL901	25050270	NSCT-6P98
	Shield plate	
	27150267	
	Bracket	
	27141059	GND
	Radiators	
	27160146	RAD-52



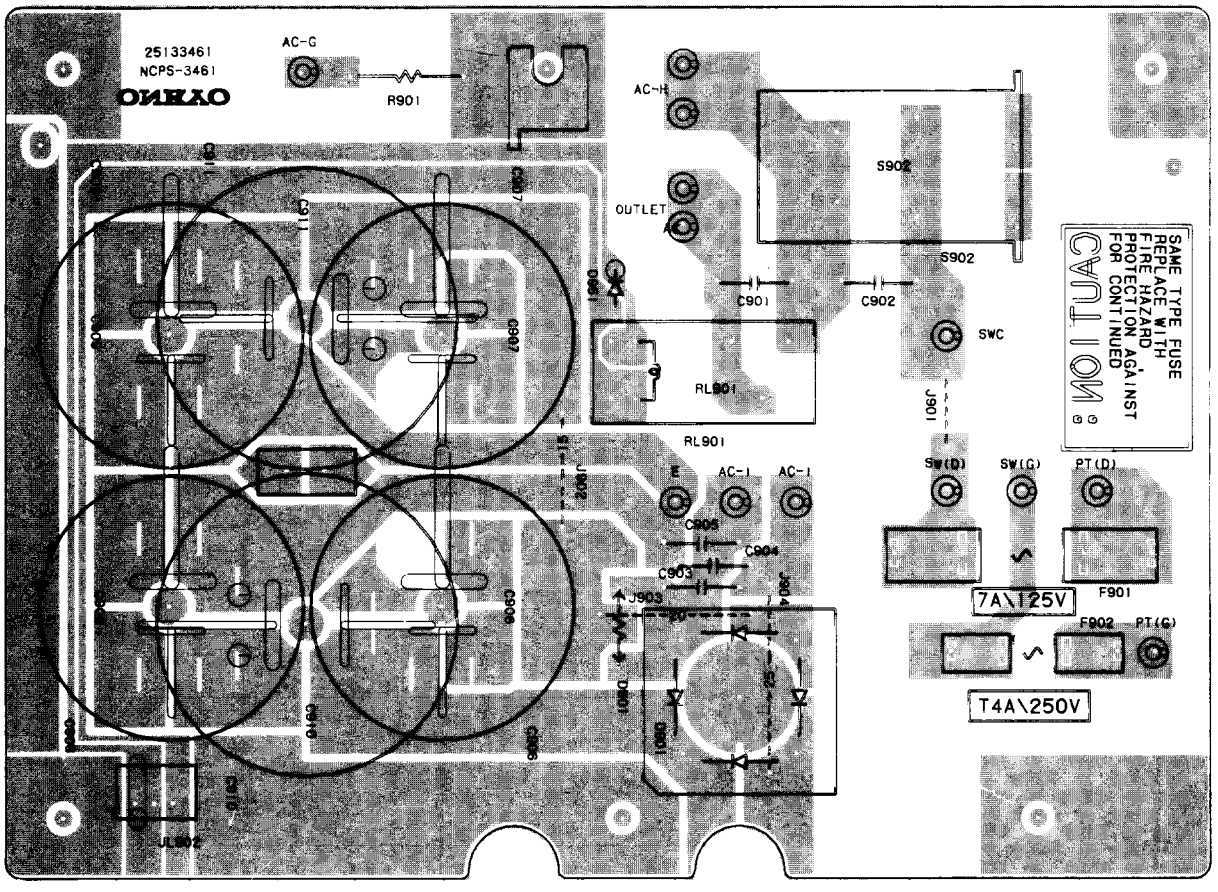
TONE CONTROL CIRCUIT PC BOARD

TONE CONTROL CIRCUIT PC BOARD (NAAF-3458-2)

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q421	22240191	NJM4565DD
Q422	222502	NJM4558DX
Q425	22240025	LC4966
	Transistors	
Q651, Q671	2211255 or	2SC1815-GR or
Q673	2210746	2SC945A-P
Q652, Q672	2212600	DTA124ES
	Capacitors	
C421, C422	354780229	2.2 μF, 50V, Elect.
C423, C424	354741009	10μF, 16V, Elect.
C425, C426	371123334	0.033 μF $\pm$5%, 50V, Mylar
C427, C428	352983396	0.33μF, 50V, Non-polar elect.
C429, C430	371124724	4700pF$\pm$5%, 50V, Mylar
C431, C432	371123934	0.039 μF $\pm$5%, 50V, Mylar
C433, C434	354780229	2.2 μF, 50V, Elect.

CIRCUIT NO.	PART NO.	DESCRIPTION
	Capacitors	
C435-C438	354781099	0.1 μF, 50V, Elect.
C439-C442	371121024	1000pF$\pm$5%, 50V, Myiar
C443	371121124	1100pF$\pm$5%, 50V, Mylar
C444	371121234	0.01μF $\pm$5%, 50V, Mylar
C445	354741009	10μF, 16V, Elect.
C446, C447	354744709	47μF, 16V, Elect.
	Resistors	
R425	5104225	N11RGLC250KWT22Z, Variable, Balance
R435, R436	5104216	N14RLC50KC22Z, Variable, Bass
R443, R444	5104216	N14RLC50KC22Z, Variable, Treble
	Sockets	
P422	2000931	NSAS-6P884
P423	2000558	NSAS-6P514

PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE



POWER SUPPLY CIRCUIT PC BOARD

PRINTED CIRCUIT BOARD-PARTS LIST

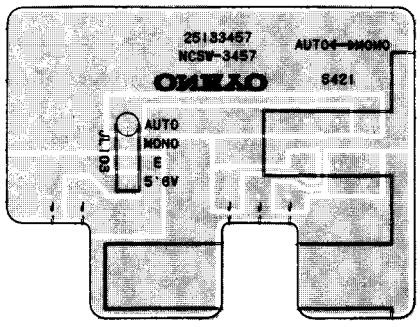
POWER SUPPLY CIRCUIT (NAPS-3461-2)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Diodes	
D901	223898	RB602
D951	223163	1SS133
	Capacitors	
C901, C902	3500065A	⚠ DE7150FZ103PAC400V/125V, Capacitor IS
C903-C905	335251039	0.01μF, 500V, Ceramic
C910, C911	3504176	20000 μF, 69V, Elect.
	Resistor	
R901	431523355	⚠ 3.3Mohm, 1/2W, Solid〈D〉
	Relay	
RL901	25065357	NRL-1P5A-DC24V-051〈D〉
	25065341	NRL-1P15A-DC24V-047〈W〉
	Switch	
S902	25035603	⚠ NPS-121-L564P
	Fuseholders	
F901a	250113	⚠ SN5051
F902a	25050065	⚠ YSH403T〈W〉

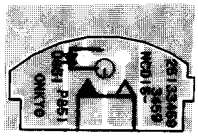
CIRCUIT NO.	PART NO.	DESCRIPTION
	Fuses	
F901	252052	⚠ 7A(ST-6)
F902	252077	⚠ 4A-SE-EAK〈W〉
	Socket	
JL901	25050267	NSCT-3P95
	Bracket	
	27141059	GND
	Buss	
	27300732	

NOTE : 〈D〉 : Only 120V model
〈W〉 : Only Worldwide model

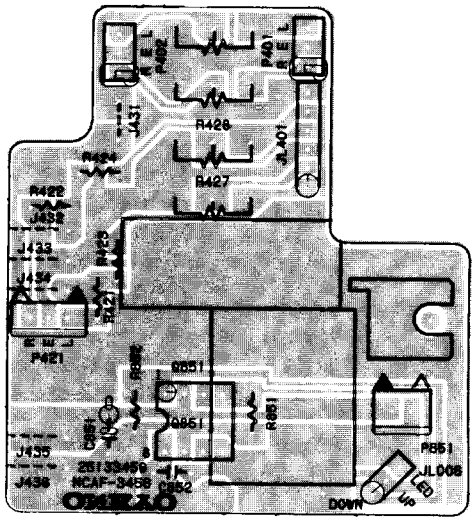
NOTE : THE COMPONENTS IDENTIFIED BY ⚠ MARK ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBERS SPECIFIED.



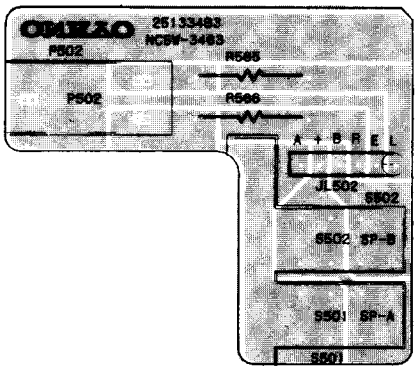
MODE SWITCH PC BOARD



VOLUME INDICATOR PC BOARD



VOLUME PC BOARD



SPEAKER SWITCH PC BOARD

POWER SUPPLY TRANSISTOR PC BOARDS

MODE SWITCH PC BOARD (NASW-3457-2)

CIRCUIT NO.	PART NO.	DESCRIPTION
S421	25035600	NPS-122-L562, Mode switch

VOLUME INDICATOR PC BOARD (NADIS-3459-2)

CIRCUIT NO.	PART NO.	DESCRIPTION
D851	225241 or	SEL2210R-C or
	225242	SEL2210R-D, LED
	27190545	Holder

SPEAKER SWITCH PC BOARD (NASW-3463-2)

CIRCUIT NO.	PART NO.	DESCRIPTION
R565, R566	441623914	390ohm, 1W, Metal oxide film
S501, S502	25035517	NPS-222-L479, Speaker switch
P502	25045187	HLJ-0541-01-010, Headphone terminal

VOLUME PC BOARD (NAAF-3456-2)

CIRCUIT NO.	PART NO.	DESCRIPTION
Q851	222963	LB1630, IC
C851	354721019	100 μF, 6. 3V, Elect. capacitor
R401, R402	5144008	N16RGL50KA30F, Variable
R427, R428		resistor
P401	2000931	NSAS-6P884, Socket
P402	2000809	NSAS-6P765, Socket
P851	2000635A	NSAS-4P591, Socket
P421a	25055133	NPLG-3P117, Plug
	27141059	Bracket GND

POWER SUPPLY TRANSISTOR PC BOARD (NAETC-3464-2)

CIRCUIT NO.	PART NO.	DESCRIPTION
Q901	2201944,	2SD1763-D,
	2201945 or	2SD1763-E or
	2201946	2SD1763-F, Transistor

POWER SUPPLY TRANSISTOR PC BOARD (NAETC-3465-2)

CIRCUIT NO.	PART NO.	DESCRIPTION
Q902	2201934,	2SB1186-D,
	2201935 or	2SB1186-E or
	2201936	2SB1186-F, Transistor